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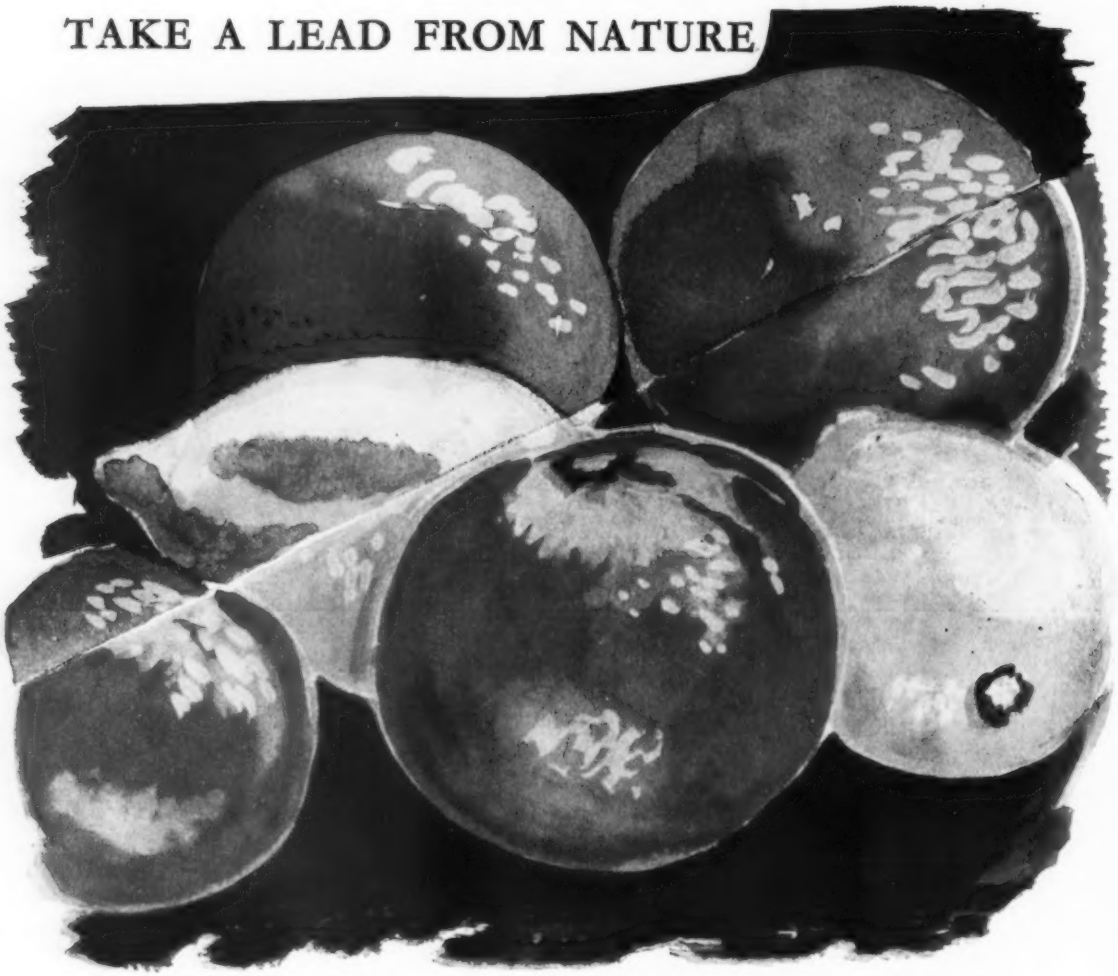

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FOOD MANUFACTURE

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FOOD MANUFACTURE

Vol. XXV, No. 8 August 1, 1950

World Canning Congress in 1951

ABOUT sixty delegates from most of the Western European countries took part in the discussions and tours which formed the programme of the spring meeting of the *Comité International Permanent de la Conserve* held in Cambridge.

The Scientific Sub-Committee, under the chairmanship of Dr. Henri Cheftel, considered the selection of subjects for discussion at the Second World Canning Congress, to be held in Paris in May, 1951. Leaders in research which has direct bearing upon canning technology will be invited to give papers upon those subjects which appear to be of the most urgent importance for the advancement of the industry. Besides providing opportunity for discussion, the Congress will show where there is likely to be redundancy and overlapping of new investigations, which should lead to a better co-ordination of the available resources and the avoidance of wasted effort. This is of particular importance today in view of the scarcity of good research workers in all fields of science, and the innumerable problems arising, snowball fashion, from the work of the past. The solution of such problems will almost certainly affect the technology and make possible improvements in canned foods of all kinds.

Another most useful object of the Congress, and one which is also served in a lesser degree by the meetings of the *Comité*, small though it is, is the bringing together in pleasant and friendly surroundings scientists who may have not met previously. These meetings often result in the forming of delightful friendships, which lead to fruitful collaboration and mutual help that is of permanent benefit, not only to the canning industry, but also to the promotion of goodwill and friendliness among nations.

The five-point programme will deal with the digestibility of canned foods as distinct from their nutritive value; the degree of sterility which is necessary in certain canned foods; the analysis of canned foods and the standardisation of methods; the marking of cans for purposes of identification; and a discussion of international legislation as it affects canned foods.

The work of other Sub-Committees at the spring meeting was devoted to discussions on the present stage of the standardisation of can sizes, and the nomenclature of the varieties of fish that are canned in different countries. For example, the word "sardine" provides an instance of the dubiety of the terms used, and for forty years there has been disagreement between countries as to the correct use of the description. Similar doubts exist in the designation of vegetable products such as "fresh garden peas" and "*petits pois.*"

A Sub-Committee has now been formed to deal with statistics of the canning industry, and members undertook to report at the autumn meeting on what statistics would be most useful and on the best method of collation.

More About Subtilin

In our April issue was mentioned the antibiotic substance, subtilin, which is being developed as a food preservative by Californian research workers. More details have been reported in recent weeks and the opinion that this substance may one day be a major factor in food canning has been considerably strengthened.

The mode of use of subtilin as a canning preservative is simple. It is dissolved in a salt solution and introduced into the cans in dilute form. The amount of subtilin required is 10 parts per million based upon the weight of the food; that is to say, only 18 grams will be needed to preserve approximately one ton of food. The cost, so far as can be estimated at this stage, is not likely to be more than 1 cent. per 10 cans. With subtilin in the can, heat treatment can be reduced to 20 minutes at the most, and sterilising temperature, even for non-acid vegetable foods or mushrooms, need not exceed 212° F. Spoilage organisms which survive this time and temperature treatment are killed.

All tests made so far on rats and mice show that subtilin, even in huge doses, is non-toxic. However, the possibilities of repercussions on human health will require very careful and long-term investigation. Without being toxic, it might reduce responses to other antibiotics when these are used in illness. The very nature of subtilin's biological potency constitutes an inescapable argument for long-term caution in development, but it is encouraging to know that nothing unfavourable to the prospects of its use has yet emerged from the preliminary tests.

Apple Acrobatics

American research is teaching the apple some new tricks. One of these is to freeze-store apple pollen from one season and use it the following year to pollinate blossoms. The pollen is easily trapped by putting coarse mesh screens at the entrances of beehives; the collected pollen is at once packed in dry ice. Preliminary tests during this winter showed that the pollen had not lost its germinating power when thawed out. This spring winter-stored pollen has been used in experiments in Californian orchards. If successful, this may lead to crossing late season apples (whose pollen would be freeze-stored the year before) with early varieties. It may also be a threat to the growth-promoting substances which can be used as sprays to secure blossom pollination without pollen and bees.

Another piece of scientific acrobatics is the development of a new spray—diethyldithiocarbamate. This makes the apple increase its production of the red skin pigment, anthocyanin. Tests have shown that fruit treated with this spray during growth have finished up about 40 per cent. redder than untreated fruit. This might be better described as cosmetics rather than acrobatics. It is not, perhaps, a wholly desirable development. Artificial devices to improve appearance seem a little out of place, especially with such an old and trusted friend as the apple. It may even lead to variety confusion on the market.

A Challenge to Quick Freezers

Although the removal of restrictions on the quantities of paper, cartons, and soft fruits has in some measure relieved the position of quick frozen food processors, their troubles are by no means at an end. The latest burden upon the industry takes the form of restriction in the use of sugar, thereby considerably reducing the volume of soft fruits that it will be possible to pack this season.

This was described by Mr. S. W. Smedley, chairman of the National Association of Quick Frozen Food Processors at the Association's annual luncheon, as "a most serious matter." Restricted output means increased overheads, but this is not the only bone of contention. Great Britain is now producing all the soft fruit that the industry can deal with; why, asked Mr. Smedley, is it necessary to import these commodities?

Taking peas as a specific example, he said that today fully 180,000 acres are being grown, and yet on referring to the recent Trade and Finance Agreement with Poland he found that the Government had contracted to purchase from January 1949 to 1953 increasing quantities for each year of the Agreement. Among the other items he mentioned under this particular Agreement were rising imports of fruit pulp, canned peas and beans, frozen vegetables, and fresh fruit.

Other countries were also sending us large quantities of frozen fruits and vegetables which, in many instances, were found to be inferior to the British pack.

The industry must also be prepared to face the effects of the proposed scheme for agricultural marketing which, if it came into being, would make the quick freezing of peas extremely difficult, if not impossible.

In so far as fruit and vegetables are concerned, the British quick freezing industry relies upon the packing of peas as its mainstay. If this were limited or stopped, it would automatically result in an increase in the cost of packing all other lines.

These dreary prognostications must be rather disheartening to a comparatively young industry, but if processors were able to bring their prices within the reach of all, this would not only discourage the importations complained of, but would create a much greater demand, thus enabling overheads to be reduced.

The Groundnut Scheme

Had the yield of nuts been comparable with the volume of criticism, the groundnut scheme would by now be generally regarded as a Government triumph. Against the political background of post-war Britain it has been difficult to judge all the critics; some have been clearly using the East African venture as just one more stick to belabour their opponents. The objectivity of the recently published report of the Committee of Public Accounts on the Overseas Food Corporation takes criticism of the groundnut scheme right out of the party-political arena. It makes sorry reading, and clearly demonstrates that the scheme was based from the start upon unbelievably faulty planning.

As is now well known, the original project was to clear 3,210,000 acres at a cost of £24 millions. Successive revisions of this scheme have reduced the acreage to 600,000 and increased the estimate to £48 millions. It is not enough merely to state these figures. The acreage reduction is of the order of 5 to 1; but the total clearance cost has doubled. In short, the initial estimate was 900 per cent. inaccurate! This, indeed, is the very inverse of decimation. To date, the scheme has cost more than £34 millions and there has been no significant revenue, nor can there be until after the 1951 harvest. The Corporation expresses the hope that a trading profit may be shown by 1954.

The principal reasons advanced for the failure of the scheme were (1) difficulty of communications, (2) the soil, (3) lack of suitable clearing machinery (Sir Leslie Plummer stated that there was *no suitable*

machinery in the world for the work to be done!), and (4) the 1949 drought which ruined the crop of that year. Of these four reasons, the first three were obviously capable of recognition before the scheme began.

The Committee has formed the opinion that the world fat situation in 1946 led to such a sense of urgency that normal commercial methods were regarded as secondary to speed. "Indeed, the sense of urgency was so great that the whole project was pushed forward with a degree of deliberate 'risk-taking' in the hope that the 1948 harvest would produce some improvement in a dangerous situation."

The report of the Committee of Public Accounts makes previous Press and Parliamentary criticism as mild and as gentle as the cooing of doves.

Horticultural Production Facts

Mainly based upon production estimate figures since 1923 and upon the periodical Ministry of Agriculture Censuses (1925, 1931, 1936, and 1944), a recent survey of fruit and vegetable production in the United Kingdom will be of interest to all food manufacturers who preserve or process horticultural produce (*Agriculture*, **57**, 1, 32-36, 1950).

Production of tree or top fruit has steadily risen. Average annual production for 1926-1935 was 359,000 tons and for 1941-1945 reached 491,000 tons. Total acreage devoted to tree fruit has remained at about 260,000 throughout the period. For individual fruits, acreages of apples, pears, and cherries have increased; plum and cider fruit acreage, however, shows a decline.

The soft fruit story is rather less happy. In the past forty years the soft fruit acreage has dropped from 80,000 to less than 30,000, reviving in recent years to reach 49,000 acres in 1949. Strawberries are almost back to their high acreage levels of the earlier part of the century. Blackcurrants have almost doubled since 1943 and their modern rise to favour has been establishing record acreages year after year. The decline is in red currants, raspberries, and gooseberries.

Figures for vegetable production are not as easy to collect with accuracy, so that these statistics are less reliable than those for fruit. Potatoes and peas harvested dry are excluded from the survey. For 1936-1939, the average acreage was 343,000, producing about 2¼ million tons; for 1945-1948, the comparable figures are 458,000 acres and 2¾ million tons. Thus, an expansion of acreage of roughly 33 per cent. has given only 22 per cent. increase in yield. This is largely because of the unprecedented winter of 1946-1947, which seriously damaged production for two cropping seasons. It seems that the vegetable acreage is now tending to fall; in England and Wales alone there was a decline of 50,000 acres in 1949.

The compiler of this survey, Mr. C. E. Pearson, N.D.A., of the Ministry of Agriculture, has finally made a total comparison of pre-war and end-of-war horticultural food crop production. Immediately before the war the annual average U.K. output was 2¾ million tons of fruit and vegetables from some 621,000 acres; by 1945 or thereabouts output was 3¼ million tons from 736,000 acres. Mr. Pearson, pointing out that in these figures there is a straight average yield of approximately 4½ tons per acre, suggests that this is notable since yields per acre usually decline with acreage expansions. It is easy to dispute this argument. Certainly much fruit that would have been discarded before the war entered the marketable crop return figures during the war; also, attention turned to high-cropping but lower-quality varieties of tomatoes and vegetables. It would be far more remarkable if the yield per acre reached by 1945 had fallen.

The true test by figures for British horticulture cannot be made until the next census and the next set of annual output figures. These will reflect the post-war period during which quality demands have gradually reappeared and European competition has intervened with some abruptness. One conclusion can be safely drawn: war-time demands and needs revived an industry which was tending to decline, and provided a new opportunity for re-establishing conditions of stable activity.

The Salmonella Problem

In view of the fact that cases of food poisoning recur with discouraging frequency, the recently published survey of Salmonella strains is of interest (*J. of the American Medical Association*, **142**, 14, 1950), especially from the point of view of diagnosis.

The large number of individual Salmonella strains and the peculiar epidemiology of some of them, together with the complex antigenic structure which has to be considered in the diagnosis of the different Salmonella types, constitute a real problem.

The disease produced in man may take one of several forms, among the commonest of which are Salmonella fever, Salmonella septicaemia with a serious prognosis, Salmonella enterocolitis, and localised extraintestinal infections, such as salpingitis, otitis, pneumonia, cholecystitis, or osteomyelitis. Some Salmonella strains are more adapted to man and are rarely isolated from animals; others are predominantly found in animals. All strains, however, are potentially pathogenic both for man and animals.

The clinical form of salmonellosis does not depend so much on the type of the infecting organism as on the age and resistance of the diseased subject. Children and young animals are more likely to have infections with fatal outcome than well-nourished

adults, in whom a simple and self-limited enterocolitis is the usual result of an infection with, for example, Salmonella typhimurium which is not infrequently isolated in cases of fatal meningitis in infants.

About 160 Salmonella strains or "types" have been described to date. These strains differ from each other in their serologic and biochemical behaviour. The exact diagnosis of the infective strain is of paramount importance for epidemiologic purposes. In the U.S.A., routine diagnostic medical laboratories are not equipped with the necessary sera or adequate personnel to carry out this "typing." For this reason, a number of typing centres have been established.

The usual sources of human salmonellosis are human carriers, especially food handlers; insufficiently cooked pork and poultry; eggs; water; food contaminated by rodents during storage; domestic pets, especially dogs; and handling of infected farm animals.

The prevention of salmonellosis by appropriate hygienic measures is the most effective way of eradicating the disease. Such measures include clean water supply, proper food inspection, periodic examination of food handlers, and treatment of sick animals.

Retort Operation

The literature on canned food processing and the penetration of heat into the cans during this operation is so comprehensive that canners will probably wonder that anything further can be said on the subject. After a long period of rule-of-thumb work, the late Dr. W. D. Bigelow, director of the National Canners' Association Research Laboratories, pioneered in the scientific investigation of processing and his contributions are recorded in the literature of a quarter of a century ago.

A more recent contribution has been made by Dr. Olin Ball by his mathematical method of calculating thermal processes based on heat penetration and bacteriological heat resistance data. Valuable work has also been done in Great Britain by the Campden Research Station and others.

In a paper read by Mr. H. A. Benjamin to the Food Technology Institute of the Wisconsin Canners' Association last April, it was mainly with one particular aspect of processing that he was concerned—the "venting" of the retort, by which is meant the elimination of air and its replacement by steam during the period in which the required temperature is being attained.

Less experienced canners and their operatives tend to ignore the importance of the presence of air in the retort and are loath "to waste steam" by opening the petcocks when starting operations.

When a retort is loaded with cans and the door sealed, before the steam is turned on the atmosphere surrounding the cans is almost all air. If the air is not eliminated it will dilute the steam and will cause temperatures to exist which are lower by a substantial amount than those which exist in pure saturated steam at the same pressure.

Of even greater importance is the fact that in a mixture of air and steam heat is given up to the can by condensation of the steam. When this occurs, the can is left with a thin film of non-condensable air surrounding it which acts as an effective insulator against further transfer of heat to the can contents.

A useful bulletin has been published in the U.S.A. in which venting schedules are listed for standard vertical and horizontal retorts, with several alternate venting schedules for different kinds of venting equipment. For example, a three-crate vertical retort equipped with a single one-inch gate valve on the top should be vented with the gate valve wide open for a minimum of five minutes and until at least 230° F. is indicated on the thermometer. These venting specifications have been worked out as a result of a large number of heat distribution tests made in canning plants.

Garlic Rediscovered

The recent report that Soviet medical men are advising good Communists to eat more garlic in order to keep fit sounds like an old classical idea rediscovered. The Romans had salt as part of their rations, but they also had garlic given them as an excitant to fight, one which presumably took the place of Congreve's "pudding and beef" which sent Britons into the fray. Hence, since garlic is *allium*, comes the maxim of early pacifists: *allium ne comedas*. In cockfights also, a touch of garlic was deemed an additional "spur" for the combatants.

Perhaps it is garlic the Russians have in mind for a new five-year plan; especially since for workers, such as builders of the Pyramids, garlic was just as stimulating as to soldiers. "Put some pep into it" may have meant garlic in those classical days, for oil of garlic has its allyl sulphide as near-neighbour of allyl isothiocyanate in mustard.

An alternative use has all the authority of Pliny, Ptolemy, and Plutarch: namely, that garlic has the power to destroy the attraction of the lodestone or magnet. We might well have saved ourselves all the work in combating the magnetic mine if we had only thought of this!

The Russians will have much to say if we make any claims for Garlic Hill and Garlichithe in London's dockland (reminders of our large imports long ago), or for our own "wild garlic," since this is *Allium oleraceum* and won't do at all.

The Determination of Moisture in Organic Substances

Part II

C. F. M. FRYD, B.Sc., A.R.C.S., A.R.I.C.

In the second instalment of this series, the author discusses the use of drying ovens in the determination of moisture.

IN spite of the widespread criticisms which have from time to time been levelled at the use of the oven as a means of determining moisture, methods based on drying and the measurement of the consequent loss in weight continue to be most widely used; they undoubtedly remain the basis of the majority of the moisture determinations having any great pretension to accuracy.

Oven methods possess the great advantages of cheapness in apparatus and materials, ease of repetition, and economy in the actual use of skilled time. For many materials these advantages have outweighed the criticisms based on the lack of differentiation between moisture and other volatile constituents, and on the overall time consumed. Objections have been met in the main by modification of the physical conditions in the drying chamber.

Changes in Oven Design

The change which has taken place within the last few years in the design of ovens has been considerable. Until the late nineteen-twenties or early nineteen-thirties drying ovens were commonly heated by hot air or steam, but the development of electrical equipment and of commercial thermostats rendered the electric oven popular, and now that method of supplying the heat necessary for the volatilisation of the moisture is probably by far the more common.

It was soon recognised[19] that the provision of spaced heating panels in the sides, top, and bottom of the oven did not in fact result in the equalisation of temperature at all points within the drying area; and many ovens constructed during the ensuing ten or fifteen years contained an internal rotating fan (frequently attached to the inside of the door) to effect such an equalisation. By such means variations of as much as 10° C. or 12° C. in the temperature of the air surrounding the drying pans were eliminated.

It appears to have been assumed that the temperature of the pans and their contents would become similarly constant, and therefore that no further major improvement in determination of moisture by oven methods could be expected. Economic factors have in recent years encouraged a re-examination of this position, and attention has been directed[20] especially to the effect of ventilation rate on the loss in weight occurring during the drying of organic material.

Anomalies in Moisture Figures

The accompanying table summarises some work which has been done in the Government Laboratory in an attempt to provide an explanation for the anomalous moisture figures obtained in the drying of bright cigarette tobacco, both in well-ventilated ovens and in ovens in which ventilation has been markedly insufficient, as compared with the moisture figure obtained at lower temperature or by entrainment or desiccation methods.

Bright cigarette tobacco, being substantially composed of cellulose or similar fibre, sugars, organic acids, and protein, is not grossly different in general composition from many foodstuffs, and undoubtedly the same kind of anomalies may be expected to occur, perhaps to an even greater extent, in the analysis of such foodstuffs.

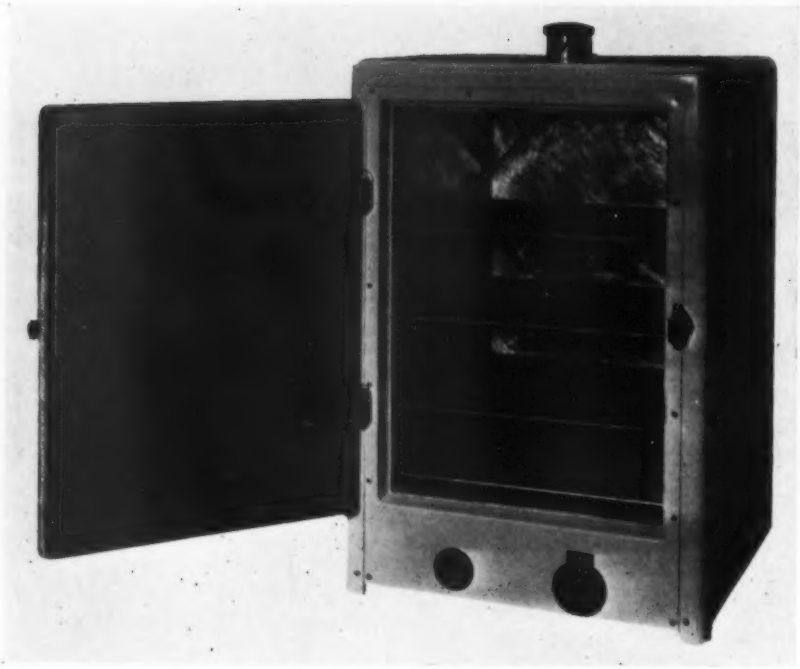
Deductions from Experiments

It is evident that as a result of heating, and particularly of heating under conditions of insufficient ventilation, major portions of the sugars present may be converted into volatile substances, while much of the remainder of the sugar is changed into non-sugar solubles and into insoluble matter. There is an accompanying reduction in the free acid present. While there is a reduction in the total nitrogen content of the tobacco, it is entirely accounted for by the not unexpected losses

TABLE I

EFFECT OF OVEN CONDITIONS ON THE COMPOSITION OF HOMOGENISED BRIGHT CIGARETTE TOBACCO

Treatment.	*Dried at 60° C.*	*Dried at 100° C. for 17 hours.*	
		With immediate full ventilation.	*After pre-treatment of 17 hours at 100° C. without ventilation.*
Total sol. matter	48·80	45·60	40·00
Total insol. matter	42·70	43·10	40·80
Apparent moisture	8·40	11·30	15·10
Sum of above	99·90	100·00	99·90
Reducing sugars	13·20	9·50	4·30
Total sugars	16·30	11·90	4·60
Free acid (ml. N/10 NaOH per 10 g. tobacco) ..	72	64	53
Light petroleum extract ..	2·75	2·77	2·66
Total nitrogen	1·47	1·39	1·32
Nicotine	1·51	1·23	1·20
Free NH_3	0·12	0·09	0·02
Nitrogen, other than NH_3 and Nicotine N	1·11	1·10	1·10
Resins	1·88	1·80	1·76



In the "Even Oven," a shrouded fan concealed behind the false back ensures an even disturbance of the contained air.
Photo Townson and Mercer.

of free ammonia and nicotine, and it is clear that protein and amino nitrogen do not make any direct contribution to the chemical loss produced by heating at 100° C.

The darkening of the heated tobacco, it has been suggested,[20] may be due to melanin reactions between carbohydrates and amino substances;[21] but it should be noted that the darkening and decomposition of reducing sugars when heated at 100° C. in the presence of organic acids is well known,[22] and almost certainly plays a major part here. In Table II is presented some evidence obtained in the Government Laboratory on this subject.

A fair deduction from the evidence of the type submitted in Table I is that chemical degradation in a system such as cellulose-protein-sugar-acid is a function not only of the temperature but also of the humidity. The effect of pre-treatment at 100° C. for seventeen hours without ventilation on the sugar content is greater, for instance, than the effect of drying for a similar period in a well-ventilated oven. There is evidence that the addition of water to such a system produces, if the sample is oven-dried, an increase in the apparent moisture greater than the theoretical.

Conversely, Iles and Sharman have shown[20] that partial drying of such material at a lower temperature reduces the total apparent moisture. It is for these and similar reasons that they insist on controlled and thorough ventilation at a rate above the threshold necessary to ensure that the atmosphere in every corner of the oven remains substantially unaffected by the moisture evolved during drying. It is clear, however, that for materials of this type the most which can be hoped of any oven method is to minimise the chemical degradation and thus to obtain comparable rather than accurate moisture figures.

Such considerations have led to a re-examination of the supposed advantages of the directly heated electric oven. As opposed to the older ovens in which convection alone, *via* one or two small orifices and aided to no small extent by cracks in and around the door, was responsible for changing the internal atmosphere, the oven of modern trend is today provided with forced ventilation.

TABLE II

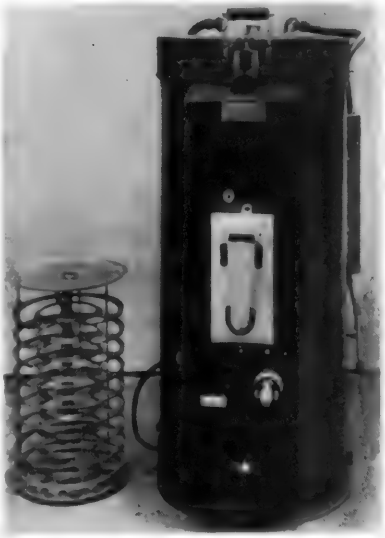
The effect of heating mixtures of 1 g. of various organic acids with 5 g. of either levulose or glucose for 36 hours in a drying oven at *circa* 96° C. Sufficient water was added at the commencement to ensure solution of the reagents in each case, but the loss in weight figures quoted below are based on the weight of the residue compared with the sum of the weights of the sugar plus acid only.

Sugar.	*Acid.*	*Loss per cent.*	*Colour.*	*Effervescence.*	*Residue.*
Glucose	Malic	3·7	Straw	Nil	Sol.
Glucose	Citric	4·5	Straw	Nil	Sol.
Glucose	Oxalic	16·4	Black	Much	Sol.
Glucose	Protein hydrolysate	16·6	Black	Much	Sol.
Levulose	Malic	8·5	Dark brown	Nil	Sol.
Levulose	Citric	9·4	Dark brown	Nil	Sol.
Levulose	Oxalic	27·4	Black	Little	Insol.
Levulose	Protein hydrolysate	12·1	Black	Much	Partly insol.

Drying Sensitive Materials

For ovens in which sensitive material is to be dried, very large heating surfaces at a fixed temperature such as 100° C. have replaced heating panels of limited size and high output controlled by thermostats; since the heat absorbed by a drying pan is at least partly received as radiation, the distance of a pan from a panel of limited size may affect the time needed to raise it to a given temperature. Moreover, the relation of all the drying pans in such an oven to the controlling thermostat may not be identical; some pans may receive more and others less radiant heat than the thermostat, and their rate of increase of temperature will vary, although the final temperature may well be the same.

In the United States ovens have been constructed in which the heating of the sample is entirely effected by very large quantities of heated air; but in Great Britain design appears to be favouring ovens of a cylindrical shape in which the base, walls, and even the top are raised to the required temperature by means of the circulation through an outer jacket of a liquid or vapour. Live steam at a controlled pressure is frequently used, and possesses the advantage of its reservoir of latent



The cage for the support of the drying pans may be seen at the side of this newer type of oven.
Photo Charles Hearson and Co.

heat. It is commonly generated from distilled water by electric heating elements, and recycled through a condenser. Inside such an oven the pans containing the samples are arranged symmetrically and in such a manner that each is at an equal distance from the heating surface; and usually a controlled stream of preheated air is blown in either from the base of the oven or through a series of perforations in a duct.

High Degree of Repeatability

Table III gives a typical series of results obtained in the oven on a homogenised sample of commercial cigarette tobacco, and illustrates the high degree of repeatability which may be expected on an organic material. Special precautions were observed when weighing out individual portions, which were of 10 grams each, to ensure that moisture was neither absorbed from the atmosphere nor lost to it.

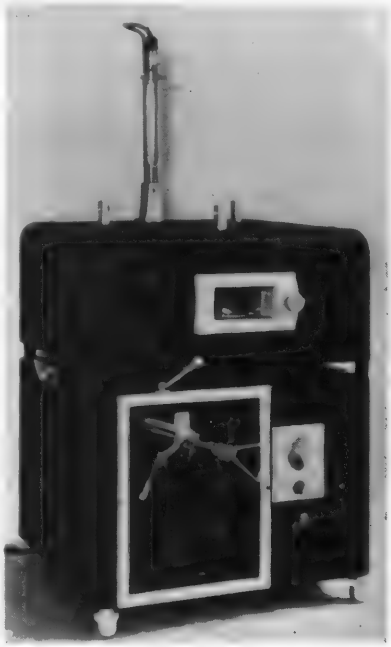
In some cases[23] the size of the oven may be reduced to the ultimate minimum where only one sample, and that perhaps of not more than a gram or so in weight, is dried at a time. In such instances special attention may be paid to conditions of heating and ventilation, and a high degree of repeatability may be obtained with comparatively short drying times,

TABLE III

PERCENTAGE MOISTURE CONTENT OF HOMOGENISED TOBACCO (10 G. SAMPLES DRIED AT 100° C. FOR 17 HOURS)

11·63	11·59	11·66	11·59	11·59	11·60
11·62	11·56	11·63	11·61	11·58	11·63
11·59	11·52	11·61	11·58	11·58	11·61
11·56	11·58	11·54	11·55	11·55	11·59
11·61	11·55	11·63	11·48	11·53	11·55
11·56	11·56	11·53	11·52	11·49	11·57
11·56	11·58	11·53	11·55	11·53	11·59
11·63	11·59	11·55	11·56	11·57	11·61

possibly fractions of an hour. An alternative method of obtaining useful results in similar short periods of time is by the use of infra-red radiation, which is stated to have both a high penetration and a special efficiency in volatilising water.



An oven for the determination of moisture with balance incorporated.
Photo Griffin and Tatlock.

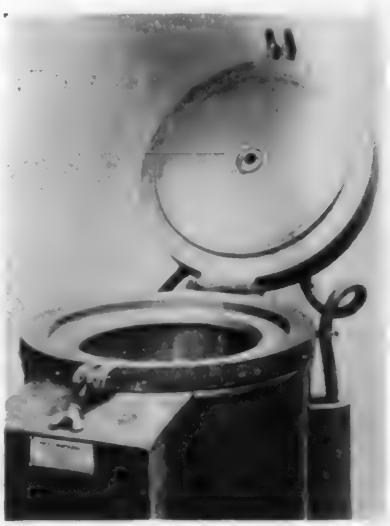
Arrangements in which the heat is generated by electrical means within the body of the sample itself are available; the sample may be either the inefficient dielectric of a condenser system in which considerable power is dissipated, or the equivalent of the secondary of a similar transformer system. In either case the procedure has advantages in that the heat produced bears a relationship to the amount of moisture remaining and, since it is produced internally, promotes uniform volatilisation without any tendency to form a dry and impermeable skin.

Somewhat akin to such methods is a process used commercially for sterilising greenhouse soils, in which the soil is placed in a container between electrodes connected to the electric mains supply. Conduction and therefore the production of heat takes place only as long as moisture remains in the soil; hence the temperature cannot rise even locally above 100° C., and the endpoint is accompanied by a dramatic drop in the current passing. For substances such as soils, of a heterogeneous nature and for which moisture figures obtained on small quantities might be markedly misleading, an adaptation of such a technique might be very useful.

Use of Partial Vacuum

Partial vacuum has been used in combination with oven systems, usually in an attempt to economise in time or to minimise decomposition by reducing the temperature of boiling of the water component. Experience in the Government Laboratory has not been wholly encouraging; many organic samples are extremely poor conductors of heat, and in the virtual absence of convection in the interstices of the material itself, heat transference is slow. Thus the attempt to economise time defeats itself.

It is also difficult to ensure adequate ventilation in the vacuum oven; the partial pressure of water



Interior of the new type of oven.
Photo Charles Hearson and Co.

A combined balance and infra-red oven.
Photo Townson and Mercer.

vapour within the sample may not in fact be reduced below that obtained in the well-ventilated conventional oven by a factor sufficient to justify the difficulties of installation. One method of modifying the vacuum oven requires that the sample be first raised to a high temperature at normal pressures; after time has been allowed for all portions of the sample to be adequately heated, the pressure is suddenly reduced. The rush of water vapour itself, and of air or other gases dissolved in or absorbed on the drying material, assists in a purging ventilation.[24]

Need for a Pressure Oven

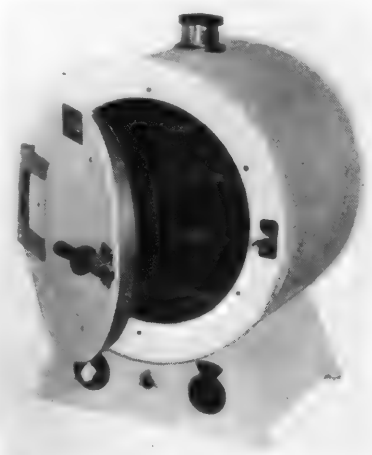
As a logical extension of the vacuum oven, the possible need for a pressure oven may be mooted. For some purposes it is necessary to dry at 100° C. substances which may be contaminated with salts, such as ammonium carbonate, which are at normal pressures volatile at that temperature. Legal requirements might be complied with and a close approach to accuracy attained if the sample were maintained at 100° C. and at greatly increased pressure for a considerable period, in an oven of small volume in which an efficient dehydrating agent removed water vapour as it was evolved.

The method of determining moisture as loss in weight on drying is not exclusively an oven method. Prolonged exposure of the sample in a desiccator containing a drying agent is well known as a safe if somewhat lengthy method of drying. Table IV shows the comparative efficiency of various desiccants.[25] The use of a comparatively high vacuum in a desiccator containing any of the last eight of the substances listed in this table will result in a reasonably accurate determination of the moisture content of most organic materials within the course of a few days or weeks unless the substance is unstable at room temperatures or low pressures, but such methods have obviously limited commercial utility.

TABLE IV

EFFICIENCY OF VARIOUS DESICCATORS

Material.	*Residual water per litre of air in equilibrium (mg.).*
Copper sulphate (anhyd.) ..	2·8
Calcium chloride (tech. anhyd.)	1·25 to 1·50
Zinc chloride (sticks) ..	0·98
Barium chlorate (anhyd.) ..	0·82
Sodium hydroxide (sticks)	0·36
Calcium chloride (pure anhyd.)	0·36
Magnesium chlorate ..	0·03
Silica gel	0·03
Potassium hydroxide (sticks)	0·014
Aluminium oxide	0·005
Calcium sulphate (anhyd.)	0·005
Calcium oxide	0·003
Magnesium chlorate (anhyd.)	0·002
Barium oxide	0·0007
Phosphorus pentoxide ..	0·00003



Cylindrical drying oven.
Photo Griffin and Tatlock.

An attempt has been made substantially to quicken the technique in the process known as lyophilisation.[6] Presumably based on the freeze-drying procedures by which sera and other labile materials are frozen while being rapidly rotated in a closed cylinder and subsequently dried in the frozen state by the maintenance of an extremely low pressure, lyophilisation relies as a first step on the adding of water to form a slurry with the organic material to be dried. This slurry is frozen at about −70° C., and while maintained at that temperature is placed in a container which is continuously evacuated by a mechanical oil-pump.

The main advantage of the process is the marked increase of surface area produced, as the organic material is expanded by the addition of the water and retains its expanded shape after the water is removed. The soluble materials are leached out from the fine interstices of the sample and dry out as a separate and microcrystalline layer. After the main bulk of the water is removed in this way, the material may be removed for a final rapid drying in an efficient desiccator.

(To be continued)

REFERENCES

[19] Tate, *Analyst*, **59**, 168, 1934.
[20] Iles and Sharman, *J.S.C.I.*, **68**, 174, 1949.
[21] Maillard, *Comptes Rend.*, **154**, 66, 1912.
[22] Evdokimov, *Sci. Mem. Univ. Leningrad. Chem. Ser.*, **3**, 38, 1938.
[23] R. W. Money, *Analyst* (to be published shortly).
[24] McLean, *J. Franklin Inst.*, **228**, 223, 1940.
[25] Vogel, "Quantitative Inorganic Analysis." Longmans, 1947.

Our Contemporaries

STATED to be one of the most highly mechanised agricultural industries in the world, pineapple growing in Hawaii is described in *World Crops*, July, 1950. Processing methods, by-products, and the maintenance of quality standards are also described. In the same issue, Dr. C. H. Cadman discusses the history of the Scottish raspberry industry.

The monosodium glutamate plant of the A. E. Staley Manufacturing Company, processors of corn and soya beans, was opened recently in Decatur, Illinois, after approximately seventeen years of laboratory and pilot plant experimentation and research. During this period of preliminary work, numerous vexing problems were encountered and solved—problems of materials of construction, processes, and method of operation.

New five-story monosodium glutamate plant of A. E. Staley Manufacturing Company.

Monosodium Glutamate

ITS MANUFACTURE AND USES

WALTER G. MEYER

Process Development Director, A. E. Staley Manufacturing Company.

Part I

MONOSODIUM glutamate is the monosodium salt of glutamic acid and is commonly referred to as glutamate. It was used extensively for a number of years in the Orient before being imported to the United States in any appreciable quantity. As the demand for glutamate increased, several American manufacturers became interested in the development of commercial units, and three companies have been producing it for a number of years. The raw materials used by these three companies have been principally wheat gluten and Steffen's waste, a by-product of the beet sugar industry.

Monosodium glutamate in its pure form is flavourless, yet it possesses the property of enhancing or intensifying the natural flavour of the food product in which it is used. As one of the principal ingredients in protein hydrolysates, such as soy sauce, it has served as an essential constituent in the diet of Orientals for many years before the pure product had been isolated or its unique properties were known. The natives of the Orient, many years ago, were aware of the flavour enhancement properties of a certain type of seaweed which was collected, dried, and ground. Even considering the crudeness of this product and certain unpleasant tastes imparted by other constituents present, they found that this dried and powdered seaweed improved the taste of their normal diet.

Glutamic acid, the parent product to glutamate, was first isolated from certain proteins by the German chemist Dr. K. Heinrich Ritthausen, in 1866. By pure chance, Ritthausen used as his

Filter presses are used for separation of protein material from water before hydrolysis, for filtering glutamic acid solution, and for removing carbon.

Storage tanks for dried protein materials and chemicals.

principal raw material for the isolation of glutamic acid gliadin, a component of wheat gluten which normally consists of approximately 40 per cent. glutamic acid. Even though forgotten for many years, the work of Ritthausen formed the principle for the first practical glutamate manufacturing operations in the twentieth century.

Japanese Research

During the early part of the twentieth century, Dr. Kikunae Ikeda of the Imperial University of Tokyo became interested in the use of the dried and powdered seaweed in Japanese cookery and began work on the determination of the substances which might be responsible for the flavour enhancement properties of this seaweed. By hydrolysis and other processing of the seaweed, Dr. Ikeda was able to isolate glutamic acid from other amino acids present in this raw material. He then discovered that this glutamic acid, when neutralised with soda, provided the flavour enhancement properties similar to those of the original material.

On April 21, 1909, British Patent No. 9440 was issued to Dr. Ikeda, the patent issuance being based on an application filed in 1908, the title of which was "Manufacture of Flavouring Material." Suzuki and Company of Tokyo became interested in the findings of Dr. Ikeda and supported research in Dr. Ikeda's laboratory at the Imperial University of Tokyo on processes for the isolation of glutamic acid from wheat gluten and its subsequent neutralisation into glutamate. Eventually, Suzuki and Company began commercial production of glutamate in Japan and their product was sold under the trade name Aji-No-Moto.

Shortly thereafter, numerous other producing companies sprang up both in Japan and in China. During the early 1920s, Dr. Ikeda and his associates instituted the introduction of this operation in the United States. After many process hardships, this industry has now become firmly established and today the U.S. is the largest producer of glutamate in the world.

Pilot Plant Activities

The Staley Company became interested in the possible production of glutamate early in 1931. This interest was stimulated due to the availability of large quantities of vegetable protein from the normal corn and soya bean milling operations of this company. At first the research and pilot plant activities were concentrated on the so-called hydrochloride process of manufacture, but this was found to be unsatisfactory, particularly from the standpoint of economics. The yields obtained were low and the process was extremely difficult to operate. At that time, the highly corrosive effects of the process presented many obstacles, most of which concerned constructional materials.

As these activities continued,

Rotary drier with a capacity of one ton per hour is used to remove moisture from the raw protein material.

The weigh hopper ensures accurate measurement of raw protein material entering the hydrolysers.

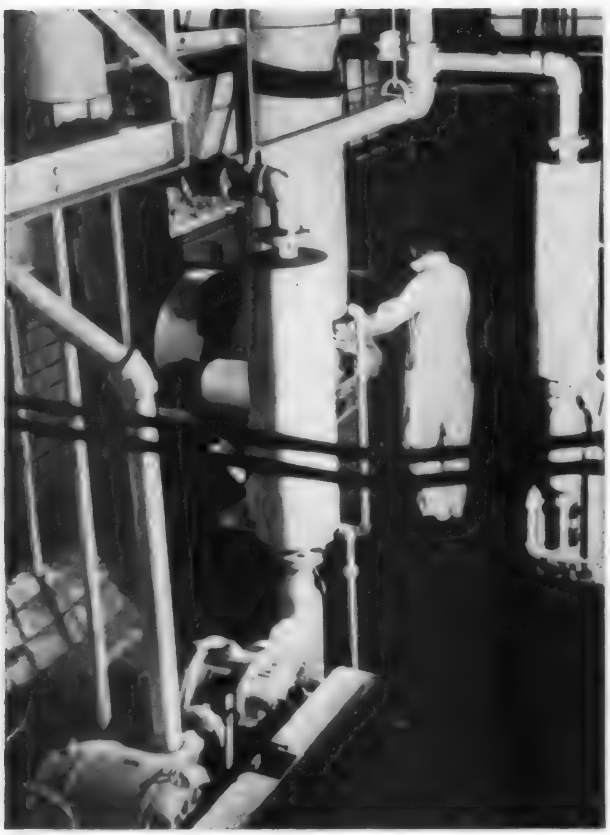
The centrifugal pumps are made of special acid-resisting alloys. Stainless steel and rubber-lined pipes are used.

the Staley Company decided to postpone construction of commercial producing units and to carry on further research and pilot plant development in order to make process improvements of both a chemical and an engineering nature. By 1940, a new process was developed and a major pilot plant put into operation to determine its efficiency.

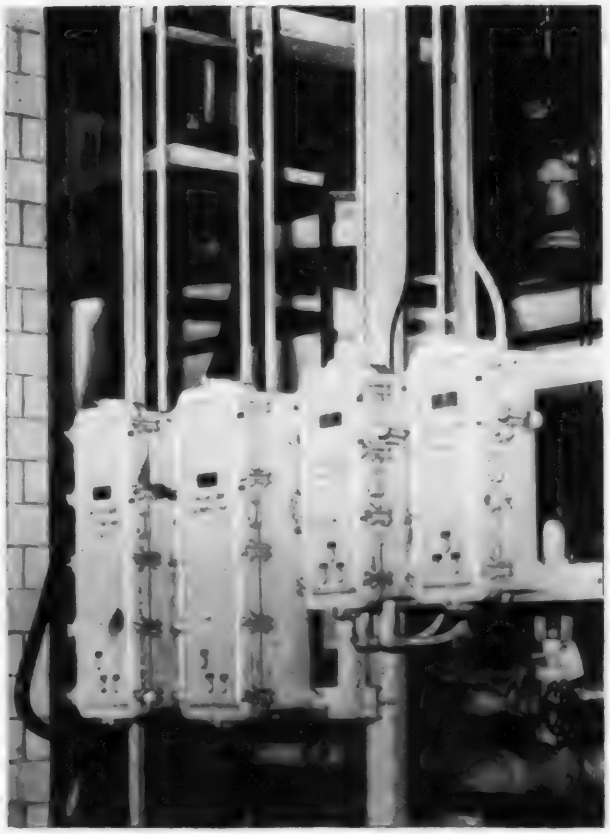
The new pilot plant was completed early in 1941 and operated successfully until 1942, at which time it was deemed advisable to curtail operations because of material and equipment shortages due to the war-time conditions. The project was revived during the latter part of 1945 and plans were inaugurated for construction of the new plant which is now in operation.

In designing the new plant, the Staley chemists and engineers devoted much of their time and

The pH recorder controller adjusts the acidity of the liquors in the glutamic acid tank.



Vacuum pumps operate the rotary filters which are employed at several points in the operation.



Starter switches are explosion-proof and control the many pumps used in the process.

efforts to the search for, and testing of, proper materials of construction in which to carry out the chemical and mechanical processes involved. The heart of any process for the production of glutamate is the hydrolysis step, which consists of a digestion of the vegetable protein in a concentrated solution of hydrochloric acid. Considering the corrosive action of hydrochloric acid, the many problems encountered in this primary operational step can be readily appreciated.

Operational Difficulties

The process itself is not complicated, but its actual operation is very difficult. Protein by-products of the company's main operations are digested in hydrochloric acid. The digestion may be accomplished under reflux at atmospheric pressure, the completion requiring fifteen to twenty hours, or it may be carried out at elevated temperatures and pressures in about four hours.

The resultant hydrolysate is diluted and then neutralised with an alkali. After cooling to the predetermined temperature, the neutralised hydrolysate is filtered in rubber-lined presses. The choice of the alkali or base to be used will depend upon the mode of disposal of waste materials, or the use elsewhere in the company's normal operations of the salt which is produced by the neutralisation of hydrochloric acid. After neutralisation, the humin or carbonaceous material is removed by press filtration and washed thoroughly. The press filtration washes are then recycled and used for dilution of the following batch.

At this point, the filtrate contains a mixture of amino acids, including the desired glutamic acid. The clear filtrate is concentrated to the point of incipient crystallisation of the inorganic salt. Several amino acids, particularly tyrosine and leucine, crystallise when the concentrated solution is cooled and they are then recovered by filtration on rotary suction filters.

Precipitation of Inorganic Salts

Again the resultant filtrate is concentrated, this time to a point at which enough inorganic salts precipitate so that the remainder of the inorganic salts do not interfere with the subsequent glutamic acid crystallisation. The inorganic salt is filtered from the solution and washed. This new filtrate then contains the glutamic acid, residual inorganic salts, and other amino acids. It is cooled and the *p*H adjusted to the iso-electric point of glutamic acid. The glutamic acid is next crystallised from this solution, a process which requires four to eight days, depending on the glutamic acid content in the solution and the amount which can be economically removed.

The higher the protein content of the solids fed into the digester, the smaller the volume of the mother liquor at this point, and hence the greater the yield per gallon of glutamic acid.

The crude glutamic acid is now ready for separation from the

mother liquor and this is accomplished by means of centrifuges. The centrifuged glutamic acid is then thoroughly washed in order to simplify the subsequent purification and crystallisation of the monosodium salt. The washes are returned to the process, while the glutamic acid is mixed with water and neutralised with sodium hydroxide to form a saturated solution of monosodium salt. This saturated solution is then decolorised by carbon. The carbon is separated by filter pressing and the clear solution sent to the crystallisation process. The carbon cake is thoroughly washed and the washes are recycled.

Crystallisation Process

Monosodium glutamate is crystallised from its aqueous solution by a carefully controlled process. A clean, white crystalline product is obtained and dried in a rotary drier to free it from the last traces of moisture. It then goes down to the packaging room, where it is put up for sale in one, ten, fifty, and one hundred pound packages. The three smaller sizes are commercially sold under the Staley trade name Zest for use in restaurants, hotels, and institutions.

Two rotary driers play an important part in the manufacture of glutamate. One is used to dry the solid protein material as it comes into the plant and before it is fed into the digesters. This drier, 45 feet long and 6 feet in diameter, has a capacity of almost 1 ton of material per hour and is filled to capacity most of the time while in use. The other is the drier at the opposite end of the five-story process. It is a small rotary, 6 feet long and 1 foot in diameter, having a capacity of only 200 pounds of finished glutamate per hour. Tons of raw material go into the process—pounds of glutamate emerge.

Because of this the risks of losses are great. Their losses, although small in percentage of the large by-product cakes and liquors, cause an immediate large decrease in yield. This, in addition to the fact that amino acids are very tricky to process, makes the general operation of the plant difficult. It is imperative that the process be completely "bottled up" in order to obtain sufficiently high yields to make the operation economically sound.

Determination of Yields

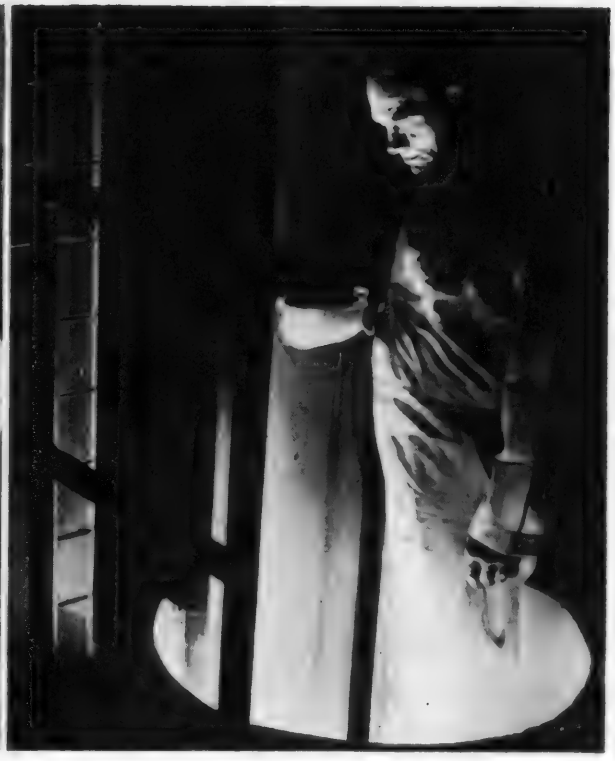
A great amount of chemical engineering is involved. There is no quick method for the quantitative analysis of glutamic acid and the process must, therefore, be operated "blind," and actual yields cannot be determined anywhere along the line until the final product is ready for packaging. The exception to this broad statement is that the glutamic acid content can be calculated from the amount of caustic soda required to adjust the *p*H. Because of the long crystallisation periods, it is therefore impossible to determine yields accurately until a week or ten days after the raw material is fed into the process. Automatic controls are required during certain phases of the operation and exceptionally close supervision is necessary.

Almost any new process such as

Large wooden tanks are equipped with agitators and are used to crystallise glutamic acid from the mother liquor.

The final crystallisation of glutamate is carried out in agitator equipped tanks. The process is partly continuous, partly batch.

The dried glutamate is weighed into 100 lb. drums in a specially constructed room.



Man hoists transport the employees between floors of the new plant.

this provides many new materials for further research. The tyrosine and leucine by-products present many interesting possibilities, as they are separated relatively free of inorganic salts. Methionine and phenylalanine are present in recoverable quantities. The mother liquor from the glutamic acid separation step, although high in concentration of inorganic salts, is a rich source material for many amino acids, including proline and aspartic acid.

Corrosion Problems

Recent progress in the field of materials of construction has contributed largely to the success of the Staley process. The amino acids at the *p*H under which the process must be operated present corrosion problems in themselves. Stainless steel of the proper formula can be used in some places and for a few pieces of equipment, such as valves and pumps. The major portion of the process, however, is so corrosive that Haveg, carbon, and rubber-lined equipment is necessary. These requirements presented problems of design of special equipment and further complications were evidenced, owing to the temperature and pressure limits of the operation.

Pipes, ceilings, and equipment supports are painted with acid-proof paint to guard against corrosion and to facilitate cleaning. In addition, the last phases of the process, the drving and packaging of the monosodium glutamate, are effected in walled-off rooms to avoid any contamination of the finished product. The Staley Company has found that these precautions are necessary in order to maintain production of a white crystalline product of the highest possible quality.

Research at East Malling

FOLLOWING the same general pattern of previous years, with the addition of a short tribute to the retiring Director, Sir Ronald Hatton, the East Malling Research Station's Annual Report for its thirty-sixth year is arranged in four parts. The first of these contains the farm report, in which is outlined the treatment of the various plantations and fields and the size of the crops harvested. On the whole the season was a favourable one for the research farm.

Section II reviews the progress of the research programme as a whole and lists the publications from the Station during the year.

Fifteen research reports, written mainly for scientific readers, are contained in the third section.

Papers in Section IV deal with the maintenance of soil fertility, frost damage, cherry pollination, rootstock propagation, strawberry varieties, the health of raspberry stocks, raspberry cane nurseries, spraying the fruit garden, apple blossom weevil, fruit spraying methods, the arrangement of the experimental plantations, and a method of estimating hormone activity.

Numerous text figures, nineteen photographic plates, and one coloured plate greatly enhance the value of the Report.

Standard for Fish Paste

The Food Standards Committee, appointed by the Minister of Food in 1948 to review the composition of foods and to recommend standards based on quality and nutritional value, has already published reports containing recommendations for standards for processed cheese, iodised salt, tomato ketchup, curry powder, and edible gelatin. Proposals for standards for cheese, ice cream, and apple juice, and revised standards for table jellies, preserves, fishcakes, coffee mixtures, mincemeat, fruit curd, and saccharin and dulcin tablets, are included in the Committee's current programme, and the Minister of Food has approved for publication a report containing the Committee's recommendations for a fish paste standard.

THE Food Standards Committee has considered a proposal from the Canned Fish Division of the Ministry that a statutory standard should be prescribed for fish paste.

The Meat Products and Canned Meats (Control and Maximum Prices) Order (S.I. 1948, No. 1509) defines fish paste as "any edible paste containing fish and usually known as 'fish paste'" and prescribes a minimum fish content of 70 per cent. with provision for a tolerance of 5 per cent. This temporary standard, while probably not affecting the higher grade products, has served to improve the quality and consequently the food value of the lower-grade fish pastes.

Although the Labelling of Food Order, 1946, does not require a statement of ingredients on the labels of prepacked fish pastes, and does not apply to open packs, a Code of Practice, specifying methods of labelling to secure that no labels are misleading as to nature, substance, or quality of either class of product in contravention of Regulation 1 of the Defence (Sale of Food) Regulations, 1943, has been agreed between the Food Manufacturers' Federation and the Ministry of Food.

Evidence of the Trade

The following is a summary of trade evidence given to the Committee:

(i) The trade consider that a statutory standard for fish paste, based on the existing temporary standard and on the Code of Practice, would be of advantage to the Ministry and to the consumer, and should provide for the prescription of the overall fish content of fish paste and also specify standards for named varieties of fish paste, although they agree that it would be difficult to determine the specific content of the named variety by analysis. The trade consider that manufacturers should not be required to disclose ingredients or to include the words "and other fish" on the labels.

The obligation to disclose the presence of other fish in named varieties of fish paste is stated to have an adverse effect upon sales at the present time. Although this dilution was not disclosed prior to the Labelling of Food Order, it was a recognised feature of paste manufacture before the war as well as during the war period. The quality and flavour of different kinds of fish vary appreciably in different seasons of the year, and dilution was often essential to obtain a balanced flavour. In the case of highly flavoured fish, such as anchovy, a 70 per cent. fish content composed only of the named fish would result in an unpalatable paste.

The minimum percentages of named fish for specified fish pastes, as laid down in the Code of Practice, are sufficient to ensure a good quality product with the most palatable flavour. These percentages were considered suitable for inclusion in a permanent standard. In the case of salmon paste, however, the percentage of salmon is affected by supply considerations and might be increased when supplies of salmon return to normal.

(ii) A fish content of not less than 70 per cent. is regarded as satisfactory and there would be no objection to the withdrawal of the tolerance of 5 per cent.

(iii) The following definition of fish paste would be acceptable for the purpose of the proposed statutory standard:

> Fish paste is made by mixing finely divided fish with a farinaceous filler with or without sugar, salt, spices, added fats, flavourings, and colouring matter, and suitably prepared to include a smooth spreadable product. The proportion of fish (including the fatty matter naturally present in the fish) shall not be less than 70 per cent.

The quantity of fat (if any) which would need to be added would vary according to the type of fish used and the season of the year; it would be difficult to determine the proportion of added fat by analysis.

(iv) The use of iron oxide is customary as a colour for anchovy paste and to a lesser extent for other pastes. The iron oxide is of pure quality and the maximum quantity used is small. Some manufacturers use artificial colouring matter instead of iron oxide.

The Committee note that there are two overseas standards. In South Africa fish paste is defined as "sound and wholesome fish with spices and seasonings with or without wholesome farinaceous or other vegetable ingredients. The fish content must not be less than 75 per cent. and the starch content not more than 6 per cent. after allowing for the normal water content of the ingredients." In Victoria (Australia) the definition requires a minimum fish content of 80 per cent.; values for starch or moisture are not prescribed.

The Committee's Conclusions

Having considered the evidence and opinions offered by the trade the Committee have reached the following conclusions:

(i) The Committee accept the trade's view that the fish content as prescribed in the existing temporary standard has proved generally satisfactory, and that a standard minimum fish content of 70 per cent. without any statutory provision for tolerance would be appropriate.

(ii) In view of the difficulty of assessing the amount of a named variety of fish used in a fish paste, the introduction of standards of composition for specific varieties of fish paste is considered to be impracticable, and the Committee consider that the specified fish content of named varieties of fish paste should, as heretofore, be governed by an agreed Code of Practice.

(iii) The Food Standards and Labelling Division is of the opinion that the use of the phrase "and other fish" on labels gives no guarantee of quality or composition and, therefore, that it affords little protection to the consumer. The Committee accepts this view.

Statutory Standard

The Committee recommend that a statutory standard for fish paste be prescribed with the following definition:

> Fish paste is made by mixing finely divided fish with a farinaceous filler with or without sugar, salt, spices, added fat, flavourings, and colouring matter, and suitably prepared to produce a smooth spreadable product. The proportion of fish (including the fatty matter naturally present in the fish) shall be not less than 70 per cent.

The composition of the Committee was:

Norman C. Wright (chairman); G. C. Barnes (vice-chairman); C. A. Adams; P. N. P. Butcher; S. J. Cowell; Jack C. Drummond; A. Glover; Harry Hague; Harry Jephcott; J. M. Johnston; G. W. Monier-Williams; J. R. Nicholls; R. W. Sutton; G. Taylor; and K. R. Allen (secretary).

Scotland's Seaweed Resources

SINCE 1947, the Scottish Seaweed Research Association's botanical staff, under the direction of Mr. F. T. Walker, has carried out a survey of approximately one-third of the 4,500 miles of the Scottish coastline for the more important sublittoral seaweed beds which are found at depths between low water mark and 7 fathoms. These surveys have already revealed over 3½ million tons of this type of seaweed, and although it will be some years before this very difficult and unique survey is complete, sufficient is now known to permit a reasonable assessment to be made of Scotland's total brown seaweed resources. When the story is complete, this should not be far short of 10,000,000 tons of wet living weed which, expressed another way, is equivalent to a potential availability of 1,000,000 tons of dry seaweed per annum.

Chemical Research

To ensure the maximum use of this vast reserve of untapped renewable material, it is obvious that the amount of the various chemicals it contains should be determined and commercial uses for some or all of these found. The latter problem is being tackled by the chemical and associated industries; the former has been undertaken by the Association's Chemical Division, which, under the direction of Dr. W. A. P. Black, have now completed the analysis of all the common types of brown Scottish seaweed collected at monthly intervals over the last four years. As an outcome of this thorough and detailed investigation, which has had no counterpart anywhere else in the world, it is now possible to assess accurately the quantities of the unusual chemicals found in seaweed, the principal of which are the carbohydrates alginic acid, mannitol, laminarin, and fucoidin, together with the algal proteins and the mineral constituents.

Since the death of the old kelp industry producing iodine by very crude methods after burning the bulk of the weed, only one seaweed chemical, *i.e.* alginic acid, has been exploited commercially to any considerable extent. Although this development has been successful and is expanding, the economics of the industry will obviously be enhanced if other constituents can be exploited, and for this reason the staff of the Association's Chemical Division, in collaboration with their colleagues working in Edinburgh, London, and Oxford Universities, have recently concentrated their efforts on assessing the potentialities of mannitol and laminarin.

In the Association's laboratories at Inveresk Gate, methods have now been completed on a laboratory scale for the production of these two chemicals in reasonable quantities. Concurrently with this work, investigations have been carried out at the Institute and at Edinburgh and Cambridge Universities to find outlets for these novel chemicals; present indications are that they could be used in the production of synthetic resins, explosives, plasticisers, and glucose.

Harvesting Methods

The Association's Engineering Division, under the direction of Mr. P. Jackson, have devoted much time to the development of mechanical methods of harvesting.

One method involves the use of specially designed grapnels which can be operated from small motor boats or fishing vessels. This method cannot satisfy the basic needs of an expanding seaweed chemical industry, but it can be used by crofters and fishermen wishing to make use of their boats in the off-season.

A second technique, known as the continuous grapnel method, operates on the dredge principle, the normal dredge buckets being replaced by rows of hooks which tear the seaweed off the seabed and, by means of a continuous belt, pass it into the hold of the harvesting vessel.

A third system of harvesting, which is now undergoing development at Shandon and at Dunbar, is known as the "cut and entrain-

ment" method and, in effect, operates on the principle of a combined lawn mower and vacuum cleaner, dragged along the rocky seabed supporting seaweed growth.

That the Association's efforts have not gone unnoticed abroad is evidenced by the fact that during the last eighteen months visits have been made or enquiries received from representatives of Australia, Canada, South Africa, New Zealand, Norway, Sweden, Denmark, France, Iceland, U.S.A., Brazil, Chile, Morocco, Spain, Portugal, and Tristan da Cunha.

Facing Overseas Competition

The example set by Scotland in setting up the Institute of Seaweed Research has now been followed by Norway and Canada, the Government of the former country having recently announced the establishment of a National Seaweed Research Institute at Oslo, while two years ago the National Research Council of Canada embarked upon a scheme of investigation patterned on the Scottish one.

It is, therefore, quite clear that overseas competition is going to be significant in the future, and if Scotland is to maintain its lead in this field continued and increasing efforts will have to be made by industry, by the various research units, and by the population deriving their livelihood from the seaweed-bearing areas.

BOOKS RECEIVED

Orders for any of the books listed below or reviewed in this issue may be placed with the Books Department, FOOD MANUFACTURE, *17, Stratford Place, London, W.1. It is regretted that under present conditions it is not always possible to supply books by return of post.*

Technology for Sugar Refinery Workers. By Oliver Lyle. 2nd Edition. Pp. 525. Chapman and Hall, London. Price 32s. net.

Chocolate and Confectionery. By C. Trevor Williams. Pp. 216+xviii. Leonard Hill Ltd., London. Price 25s. net.

Survey of World Meat Production

WORLD exports of beef in 1949 were about 12 per cent. below the pre-war level, while pig meat exports were less than half of the 1938 figure, according to a recent report* published by the Commonwealth Economic Committee; on the other hand, world trade in mutton and lamb recovered in 1949 from the low level of the preceding year and was 20 per cent. higher than before the war, while exports of canned meat, although continuing to decline, were still 33 per cent. greater than in 1938. The Commonwealth share of world exports in 1949 rose for mutton and lamb and for canned meat but fell for beef and bacon. Commonwealth countries supplied about one-half of the United Kingdom's imports in 1949, compared with about three-fifths in 1948 and two-fifths before the war.

Output in both Australia and New Zealand has been well maintained in the post-war years, but in North America, where livestock numbers declined until 1949, production has fallen accordingly.

World exports of beef, which by 1947 had recovered to 85 per cent. of the pre-war figure, fell substantially in 1948, when shipments from the United States were small and those from Argentina and Australia showed a slight decline, but recovered again in 1949. Trade in mutton and lamb fell in 1947 and 1948, as the result of a slight reduction in Australian exports in 1947 and a heavy decrease in Argentine supplies in 1948, but some recovery was apparent last year, when the total was still well above the 1938 figure. World exports of bacon were reduced after the war, as Canadian shipments declined substantially but increased in 1949 with the recovery in European exports. On the other hand, world trade in pork declined continuously after the war until 1948, when an upward movement became apparent, as a result of heavier exports from Australia, New Zealand, and European countries. World exports of canned meat had fallen by 1948 to about two-fifths of the record level for 1946, heavy reductions being recorded for both Canada and the United States.

Exports of beef from Commonwealth countries, which pre-war accounted for about one-quarter of the world trade, rose to about 36 per cent. in 1948, when Canadian exports increased considerably. Two Commonwealth countries, Australia and New Zealand, accounted in 1947 for about two-thirds of total trade in mutton and lamb; the proportion rose to the pre-war level of 80 per cent. in 1948-49. Denmark was formerly predominant in the bacon trade, with Canada taking second place, but as production in the former country had only partially recovered by 1948, the Commonwealth share remained virtually unchanged at 60-65 per cent. between 1946 and 1948; in 1949, however, Canadian exports fell, while those from European countries increased considerably and the Commonwealth proportion fell accordingly to approximately 20 per cent.

With increased shipments from Australia and New Zealand and less from other sources, Commonwealth pork exports have recently increased in importance and Commonwealth countries have retained about one-quarter of the world trade in canned meat.

The high level of *per caput* consumption of carcass meat in the major producing countries was well maintained in 1946-47, but a slight recession was apparent later, except in Australia, New Zealand, and Argentina. Nevertheless, consumption in the United States during 1948 was 146 lb. a year compared with 127 lb. before the war, and in Canada 127 lb. as against 111 lb.; in Australia and New Zealand, however, consumption was less than before the war. In the United Kingdom, meat consumption declined considerably in 1947 and 1948 but showed little further change in 1949, at about 74 lb. per head compared with 119 lb. pre-war.

* *Meat, 1950.* Pp. 101+xiii. Published for the Commonwealth Economic Committee by H.M. Stationery Office. Price 5s. net.

Oslo harbour and Town Hall.

A street scene in Bergen.

Spring in Scandinavia

MEMBERS of the Food Group of the Society of Chemical Industry who participated in this year's summer tour to Norway were unanimous in their verdict that the selection of this *venue* was a happy one.

At King's Cross on the morning of Saturday, June 3, members of the tour checked in and were on board m.v. *Bretagne* sailing Oslo bound in the evening. The latest Food Group tour—the fifth since the war—had started.

It was at the first lunch on board that those new to travel in Scandinavian countries had their first experience of *Smørbrød*. The English translation of this word is "sandwiches," which shows how poor translation can be! *Smørbrød* consists of a bewildering array of every conceivable cold viand; the luncher carries his plate along a table laden with such things as ham, tongue, chicken, cheese, lobster, sardines, and baked beans, to mention only a few. A sight for the *gourmet* as well as the *gourmand*!

Host and Guests Meet

After spending two nights and a day at sea, we arrived in Oslo bright and early on the morning of Monday, June 5. No time was lost in starting the business of the day. We gathered for the opening meeting in the Chemical Department of the University at Blindern, where hosts and guests got together for the first time at morning coffee in the large chemical laboratory.

In the lecture theatre, Professor Endre Berner, of the University, chairman of the Norwegian Tour Committee, whose subsequent unfailing attendance and untiring energy contributed so much to the success of the tour, welcomed us in happy terms, after which a paper on British food legislation was read by Mr. C. A. Adams, assistant secretary, Ministry of Food. In the unavoidable absence of Dir. Eirik Heen of the Norwegian Fisheries Research Station, Bergen, Dir. T. Sparre of the Norwegian Herring Oil and Meal Industry Research Institute, Bergen, read Dir. Heen's discourse on the Norwegian fish industry. Visits to the chemical and physical laboratories of the University occupied the rest of the morning.

The first meeting of the Tour in the Lecture Theatre of the University at Blindern during which discourses were delivered by Prof. Endre Berner, Mr. C. A. Adams, and Dir. T. Sparre (deputising for Dir. Eirik Heen).

Visit to the Viking Ships

The afternoon was taken up by conducted visits to Bygdøy, where a museum has been built to house the three world-famous Viking ships which were found near Oslo Fjord. In spite of being buried for a thousand years, these vessels are in a remarkable state of preservation. The ship *Fram* of storied adventure and achievement in Polar seas, both north and south, was also inspected. Dr. Johannesen, Director of the Viking Ship Museum, gave an interesting talk during this visit.

The Norwegian Chemical Society and Norwegian chemical firms were the joint hosts at a dinner

Akershus Castle, Oslo, formerly the residence of the Norwegian Royal Family.

Some of the works of the great sculptor Vigeland in Frogner Park, Oslo.

given in the evening at the well-known Ekeberg Restaurant, at which Dr. Aage Lund acted as toastmaster. Dir. Aage W. Owe, President of the Norwegian Chemical Society, proposed the toast of the Food Group, which was responded to by Mr. A. L. Bacharach, M.A., F.R.I.C., chairman of the Food Group. The Norwegian Chemical Society was toasted by Dr. H E. Cox, F.R.I.C., Past President of the Group. After dinner, the pleasant mingling of hosts and guests was enhanced by the Norwegian mastery of the English language.

Milk and Chocolate

Early next day we were transported by coach to the Fellesmeieriet, one of the largest milk-handling concerns in Norway. On our arrival, a talk was given by Mr. Hans Furuseth on the control of milk production carried out by the concern. All Norwegian cattle stock is free from tuberculosis and, to a very large extent, is exempt from other contagious diseases, with the exception of mastitis, which is causing considerable loss to milk producers, who are taking energetic steps to combat it.

We were conducted round the different departments dealing with the handling of milk and the production of condensed milk, butter, ice cream, and frozen fruits and vegetables. The visit concluded with the partaking of refreshments among which were included a number of the products of the Fellesmeieriet.

By midday we reached the Freia chocolate factory, round which we were shown by Chief Engineer Haavardsholm. This firm makes a feature of co-operation with its workpeople. Apart from the factory itself with its air-conditioning, we could not fail to be struck by the attractive canteen which led on to beautifully laid out gardens that are available to all operatives during rest hours. Again the unfailing hospitality of our hosts was exemplified in the lavishness of the luncheon served in the factory canteen, at which Dir. Harald Throne-Holst made a speech of welcome, responded to by Dr. J. R. Nicholls.

The paintings of Edvard Munch were viewed at the University Aula, which, together with the National Gallery, was visited during the afternoon. A further visit was made to the Frogner Park, where the sculptural works of Gustav Vigeland made an unforgettable impression on us all.

The day was rounded off by an excursion to the Frognerseter Restaurant, situated high above Oslo, for supper.

Floating Whale Factory

The whole of Wednesday was occupied by an excursion to Sandefjord at the invitation of Jahres Kjemiske Fabrikker and Sandar Kjemiske Fabrikker. We were accompanied by Professor W. Werenskiold of the Geografisk Institut, Blindern, who very kindly provided us with a written description of the geological aspects of the country through which we passed. On arrival at Sandefjord, Dir. Th. Arentz described the lay-out of *Kosmos III*, one of the whale factory ships, and we were conducted round by officers and members of the technical staff. A visit was also made to the whale oil refinery and hydrogenation plant, where fatty alcohols and their commercial derivatives are produced. We were entertained

The storied "Fram" of north and south polar exploration.

Boarding the coach at Karl Johansgate, the rendezvous for most of the visits.

to an excellent lunch by Dir. Arentz and his colleagues.

In the evening we gave a dinner in honour of our Norwegian hosts at the Bristol Hotel. The toast of "Our Norwegian Guests," proposed by Dr. A. J. Amos, was responded to by Professor Endre Berner. "Anglo-Norwegian Friendship" was proposed by Mr. A. L. Bacharach, to which Professor W. Werenskiold replied.

Oslo's Largest Bakery

On Thursday, June 8, we split up into five parties. One party, which visited the Kristiania Brødfabrik bakeries and research laboratories, was welcomed by Dr. Arne Schulerud, who conducted the tour of the factory. This is the largest bakery concern in Oslo, in which a wide range of different kinds of bread is produced. Nearly all the bread is baked on sheets or on the oven sole. A straight sponge type of process is followed by comparatively short, hot final proof, and a twenty-five-minute bake. The confectionery bakery is on a smaller scale and a range of high-quality small goods was in production.

After a tour of the Freia factory, lunch was served in the well-appointed canteen.

Drugs, Vitamins, and Margarine

Establishments visited by other parties were the factory and research departments of Nyegaard and Co., manufacturers of pharmaceutical chemicals, and the research department and factory of E. and O. Collett and Co., manufacturers of vitamin A concentrates and other special vitamin products. Some work was also being carried on in the latter company's research department on fish albumen. Yet another party visited the margarine factory of Aug. Pellerin Fils and Co., where they were received by Mr. John P. Lyng, chief engineer.

On board the whale factory ship "Kosmos III" at Sandefjord.

The ladies, for the most part, went on a shopping expedition. Much mention of nylons was heard, but in this respect disappointment ensued—they were on coupons!

Visits to Breweries

The Group divided into three parties, each visiting one of three breweries, the Ringnes, the Frydenlund, and the Schou. Our group visited the Ringnes Brewery. We were graciously received by Mrs. Ringnes in the unavoidable absence of her husband. A tour of this leading export brewery was made under the direction of Mr. H. R. Jacobsen. It is the proud claim of the firm that their beer has penetrated from the Equator to the North Pole.

The name of Ringnes is especially bound to Norwegian polar research and to Norway's polar vessel *Fram*, and large territories 80 North and 100 West are named after the founders of the firm, Amund and Ellef Ringnes. In the handsome board room, around the walls of which hung oil paintings depicting some of the incidents in the lives of Nansen and Amundsen, luncheon, presided over by Mrs. Ringnes, was served at which the different excellent brews of the House were sampled.

Prof. E. Berner in the garden of the Freia factory with Mrs. Andrews and Mrs. Morgan.

Dr. and Mrs. Arne Schulerud in the brewhouse of the Frydenlund Brewery, Oslo.

Luncheon in the board room of the Ringnes Brewery, Oslo.

Mr. Jacobsen, in a short speech, welcomed us, and Mr. A. P. Buchanan responded.

The time was approaching for us to say farewell to Oslo. In the afternoon the more energetic of us climbed to Akershus Castle, which was once used by the Royal Family, and thence to the last function of this part of the tour—a dinner offered by the Norwegian Chemical Society and Norwegian industries at the Skansen Restaurant, which alleviated for the moment our thoughts of impending departure. Professor Endre Berner bid us God-speed, Mr. S. Butterworth responding on behalf of the Group. The proceedings ended with the presentation to Mrs. Berner of a bouquet of flowers by Mrs. A. L. Bacharach.

Bergen Bound

It was not long afterwards that we were installed in our respective sleepers on board the train bound for Bergen, a journey which, for those who were awake, was fraught with beauty. After the summer atmosphere of Oslo (the weather had been consistently kind) it came as something of a surprise to look out from the carriage window and watch a snowstorm as the train climbed its way 4,000 ft. into the mountains. During the gradual descent, the scenery was impressive in its grandeur and, in the words of a lady member of the party who saw the Northern sunrise, the sight was "almost unbelievable in its beauty and well worth the entire journey to Norway."

The Group wait to embark on the launch for the visit to Horsøy.

Two lady members of the Tour seated by the fountain in front of Oslo Town Hall.

By Steamer to Horsøy

Dir. T. Sparre was on the platform to receive us at Bergen and, after registering at our respective hotels, we left by coastal steamer for a visit to a herring oil and meal factory and a cannery at Horsøy. We were received and conducted round the factory by the son of Mr. Oscar Ottesen, the manager, deputising for his father. At the cannery, Mr. Olav Johnsen, manager of the Bergenhus Canning Co., briefly described the work and conducted us round the extensive factory which, at the time of our visit, was engaged on the canning of brisling and sild.

Some of our Norwegian hosts bid farewell to the Group at Bergen.

The afternoon was spent at the Norwegian Fisheries Research Station, where the work of the laboratories was explained by Dir. Eirik Heen and his colleagues. Dir. Heen was a member of the Norwegian Tour Committee and was responsible for arranging the series of visits in Bergen.

Farewell to Bergen

The final social occasion took place in the Grand Restaurant, where, as the guests of Dir. S. Bartz-Johannessen, director of A/S Stood Herring Oil Factory and Shipbuilding Yard, Mr. Olav Johnsen of the Bergenhus Canning Co., and Mr. Oscar Ottesen of the herring oil factory, members of the Group were entertained at a dinner which was enlivened by music from an orchestra playing selections of Norwegian and British melodies. Dir. T. Sparre, who also acted as toastmaster, proposed the Loyal Toast, after which Mr. Sverre Hjorth-Hansen, Presi-

At sea, homeward bound. Sunday afternoon on board s.s. "Jupiter."

dent of the Bergen Section of the Norwegian Chemical Society, toasted the guests. In responding, Mr. A. L. Bacharach enlarged upon the theme of Anglo-Norwegian friendship which formed the subject of his speech at the Food Group dinner in Oslo. Mr. H. C. Moir and Dr. J. R. Nicholls also spoke.

After the dinner, hosts and guests foregathered and the proceedings developed into an animated singsong. At the piano, ably presided over by Dr. Dyson, traditional English songs were sung; a performance of the Highland Fling by eight of our members brought forth much applause. Later our Norwegian hosts brought the orchestra along and contributed an impromptu programme of Norwegian songs conducted with verve by Dir. Sparre.

Norway in Retrospect

On Saturday morning the last coach excursion was made to Troldhaugen, home of Edvard Grieg, and then—our departure on the s.s. *Jupiter*. Although time did not permit of a detailed impression of the cities of Oslo and Bergen—visits to industrial concerns, trips, and conferences followed each other with almost bewildering rapidity—there must have been carried away by everyone memories of cool, tree-shaded squares, of handsome shops and stately buildings, of wide, clean streets, while Oslo's University students in their long-tasselled caps and red jackets lent a picturesque note as they passed to and fro in the spring sunshine.

In Conclusion

At dinner on board on Sunday night, a pleasant little ceremony was observed—the presentation to Mr. and Mrs. H. Egan of a set of spoons in token of appreciation of all concerned for Mr. Egan's efficiency and energy as hon. organising secretary of the Tour. His was a strenuous task, willingly and courteously performed. Tributes are also due to the following who acted as travel stewards and shepherded their parties with a kind but firm hand: Dr. A. J. Amos (chairman of the Food Group Tour Sub-Committee); Mr. R. C. Baker; Mr. A. P. Buchanan; Mr. E. M. Learmonth; Mr. H. C. Moir; and Mr. R. H. Morgan.

(*Concluded at foot of next columns*)

Newcastle was reached during the early hours of Monday morning, and the last goodbyes were exchanged at King's Cross in the afternoon.

Comparison is odious, but it was the expressed opinion of many of the members of the Tour that this was the "best ever."

The Norwegian Tour Committee was composed of the following: Prof. Endre Berner (chairman); Mr. Gunnar Baalsrud (secretary); Dir. Eirik Heen; Mr. Hans Kringstad; Dr. Aage Lund; Mr. Thomas Naess; Prof. Ragnar Nicolaisen; Dr. Arne Schulerud.

Those taking part in the tour were: Mr. and Mrs. C. A. Adams; Dr. and Mrs. A. J. Amos; Miss J. A. Anderson and Mrs. J. B. Anderson; Mr. and Mrs. J. Andrews; Mr. and Mrs. A. L. Bacharach; Mr. R. C. Baker; Mr. and Mrs. F. K. Birkett; Mr. J. Plunkett Bowley; Mr. A. P. Buchanan; Mr. F. C. Bullock; Mr. and Mrs. S. Butterworth; Major W. H. Cadman; Mr. W. G. Carey; Mr. E. Chilman; Dr. and Mrs. H. E. Cox; Mr. and Mrs. T. Crosbie-Walsh; Dr. C. de Worms; Mr. A. H. Dodd; Dr. and Mrs. G. M. Dyson; Mr. and Mrs. H. Egan; Mr. and Mrs. T. H. Fairbrother; Mrs. N. E. M. Graham; Mr. W. V. Griffiths; Mr. and Mrs. A. N. Harrow; Mr. E. M. Learmonth; Mr. and Mrs. T. McLachlan; Mr. and Mrs. R. F. Milton; Mr. and Mrs. H. C. Moir; Mr. and Mrs. R. H. Morgan; Dr. J. R. Nicholls; Mr. R. J. Nicholls; Dr. A. J. V. Underwood; Mr. and Mrs. W. L. Warner; Mr. and Mrs. J. B. Wilton; Mr. and Mrs. C. E. Wiseman.

Regional Dishes

BOTH regional and national recipes have become topics for discussion this summer, particularly with foreign visitors coming to Britain in increasing numbers. Although many of our hotels boast of French and Italian chefs, this year's invaders will relish something novel, something different from mediocre imitations of what they can get at home. With more raw materials available, one pleasing pointer to what can be done is a new recipe book* which, according to the sub-title, is "A *Vade Mecum* for the Epicure in the British Isles," a description not quite justified in view of the fact that many more regional dishes could have been included.

County Rivalry

Although the difficulty of satisfying all is obvious, there will no doubt be many jealous calls for correction. For instance, should Lady Cake be credited to Wiltshire rather than to Hampshire? And surely black puddings are as much at home in Yorkshire as in Lancashire, Staffordshire, and Scotland, just as is parkin, a cake common to several northern shires?

Some dishes present no difficulty, provided no bias is present among rival partisans. To Yorkshire belongs the buttered grouse, to Somerset the authentic Bath Olivers, and to Oxford its Brasenose ale. Nor need we question bere-meal porridge as belonging to misty Shetlands or Orkneys, or doubt the locale of Cornish splits and Cornish pasty, of Snowdon pudding, and many others.

Calls for corrections will doubtless be followed by clamours for the addition of recipes such as Lincolnshire's haslet, or those Lancashire chips, the fame of which Mr. Ben Abbott the other day assured us "springs undoubtedly from their scientifically devised cubic proportions."

Not so long ago Sir Thomas Beecham gave encores at his concerts on tour in exchange for Dundee marmalade and Melton Mowbray pie. Should he be looking for inspiration in bartering further, this book, with its prelude by Bernard Darwin, will serve very well!—M. S.

* *Receipts and Relishes*. Pp. 72+maps. Whitbread and Co., London. Price 5s.

Developments in Vitamin Research

IT was found as early as 1926 by Minot and Murphy that liver was effective for treatment of pernicious anaemia, and workers in Norway, Switzerland, and Britain dealt with the problem, but it was not until twenty-two years later that the active principle now known as vitamin B_{12} was isolated in crystalline form.

In 1948, within a few weeks of each other, Folkers and his co-workers in America and Lester Smith in Britain announced its achievement independently. Owing to difficulties in testing and to the need for clinical evaluation, much delay was caused and only recently has microbiological assay been available (Shorb in America using *Lactobacillus lactis* Dornier as test organism).

Isolation by Physical Methods

Owing to absence of particular chemical properties, the vitamin has had to be isolated from liver by methods almost exclusively physical. These included adsorption (charcoal or alumina) and partition chromatography (using damp silica and butanol). In the latter method, three coloured zones were obtained: brown at the top, pink in the middle, and yellow at the bottom. Dr. C. C. Ungley found by clinical tests that nearly all the activity was concentrated in the pink fraction which provided the indicator for further work.

Persistent peptide impurities impeded further progress until they were destroyed by proteolysis using trypsin; after further lengthy purification by chromatographic methods and subsequent concentration, the pure vitamin was ultimately obtained as deep red crystals from aqueous acetone. The immensity of the task can be appreciated if it is realised that 1 ton of liver was required to give 15 mg. of pure vitamin B_{12}.

The substance has a phenomenal potency producing haemopoietic response in pernicious anaemia in doses of about 0·001 mg.; folic acid of 5,000-10,000 times this amount is needed for the same response.

A remarkable feature of this vitamin is that it contains about 4 per cent. of cobalt, this being the first time that this metal has been found in a pure material of biological origin.

Animal Protein Factor

Alternative sources of the vitamin have been sought, and work on the "animal protein factor" has shown that it could be synthesised by certain intestinal bacteria. This led to the possibility of its being produced by fermentation methods, and it has been discovered that it can be synthesised by *Streptomyces griseus*, which is used in the commercial preparation of streptomycin. Industrial preparation of purified vitamin B_{12} concentrates from this source is now in operation in Great Britain.

Interest in the work on anti-pernicious anaemia did not slacken with the isolation of vitamin B_{12}, and already another red factor, vitamin B_{12b}, also clinically active, has been separated using chromatographic techniques.

Discussion Time

In the ensuing discussion, both Dr. Herd and Dr. Pankhurst asked questions concerning the loss of the vitamin on charcoal, and Dr. Lester Smith replied that little was known about resulting inactivation which might be due to destruction or irreversible adsorption; X-ray methods might have given information about the structure of the molecule which would have thrown light on this problem.

Mr. Garrod was informed that absorption spectra technique was not suitable for assay purposes because of interference by other substances present.

Dr. Young enquired if anything was known of the function and mode of action of vitamin B_{12} in the human body; the lecturer stated that the vitamin seems to be necessary for normal nutrition and is concerned in some manner with the replacement of the red blood cells. Even pernicious anaemia patients excrete vitamin B_{12}, but suffer from some form of stomach atrophy which prevents absorption by the intrinsic factor.

In answer to another question, Dr. Lester Smith stated that there was more cobalt present in liver than could be accounted for in the vitamin. He further said that the vitamin had been christened vitamin B_{12} by the American workers, and it has been the custom to list it with the water soluble vitamins of the B group.

Costs and Cobalt Deficiency

Mr. Markwell enquired about the relative cost of treatment by liver extract and by the vitamin, and was told that the treatment by concentrates obtained from *Streptomyces griseus* as a by-product of streptomycin manufacture was now the cheaper.

A question was asked about the well-known pining sickness among sheep in Australia traced to cobalt deficiency in pastures and whether this was connected with vitamin B_{12} deficiency. The lecturer replied that treatment by injection of the affected animals with the vitamin had given negative results; cobalt taken by the mouth seemed to be necessary for the development of rumen bacteria, some of which synthesise the vitamin.

Vitamin B_{12} in Yeast

Asked if there was any evidence of the presence of the vitamin in yeast since Marmite possessed anti-pernicious anaemia properties and contained traces of cobalt, Dr. Lester Smith replied that he and Dr. Ungley had been working on yeast extracts which undoubtedly contained a potent anti-pernicious anaemia substance which was not vitamin B_{12}. More work on the "Wills factor" was needed. The fact that yeast contained cobalt might not have any significance.

Abstract of a paper read by Dr. E. Lester Smith of Glaxo at a meeting of the London and South-Eastern Counties Section of the Royal Institute of Chemistry held at Acton Technical College on February 14, 1950, with Dr. C. W. Herd in the chair.

Employer-Worker Co-operation

FIFTY years ago the London biscuit firm of Peek Frean and Co., which had been established in 1857, appointed their first medical officer, and, shortly afterwards, laid the foundations of a works dental service. Out of this pioneering effort has grown a fully comprehensive personnel department which maintains the company tradition of personal interest in the lives of all its employees from recruitment to pension age, and even into retirement.

Function of the Labour Officer

The personnel function is the responsibility of the labour officer, Mr. R. G. Allsop, who advises the board on matters of policy affecting employees, and ensures that approved policies are applied throughout the factory. He is also responsible for maintaining the agreed company wage structure. A most important part of his work lies in joint consultation, and he acts as principal management representative on the joint consultative committees. Internal problems which cannot be settled at departmental level go to the labour officer and matters involving trade unions are negotiated by him. He also maintains liaison with the catering manager, the pension fund secretary, the sports club secretary, and outside organisations.

He is assisted by a senior officer of his department who deputises for him in the administration of the personnel function, but does not share his responsibility for negotiations with the trade unions. This assistant is particularly concerned with women's personnel matters, and also carries responsibility for all training within the factory up to and including supervisory level.

Two employment officers, one woman and one man, are responsible for recruitment of employees, while two other officers assist in this work, but are primarily responsible for welfare services. The medical department is staffed by a full-time medical officer (who is also the accident prevention officer), a state-registered nurse, and two first-aid attendants.

The company has also had pioneer experience in joint consultation, having established a works committee in 1918. The present committee consists of thirty elected representatives of employees and four members of management nominated by the directors. This body has very wide terms of reference, which include the consideration and framing or amending of works rules, hours of work, working conditions, wages and adjustment of wages (but not standard rates), grievances, holidays, hygiene, accident prevention, conditions of employment, and employees' suggestions. The committee is elected biennially by secret ballot, and nominees must be at least nineteen years of age and represent the employees of a particular works section. Meetings are held monthly under the chairmanship of a worker representative.

Joint Consultation

The joint council is the highest level at which joint consultation takes place, and its functions are to investigate proposals and make recommendations to the directors and, if desired, to the works committee for implementing the objects of that committee. Its constitution is nine employee members elected from the works committee, together with nine representatives of management nominated by the directors, of whom at least three are members of the supervisory staff.

Each of these two main committees has a number of subcommittees dealing with various aspects of their functions.

Good Fellowship Fund

An unusual feature of the firm's welfare facilities is their Good Fellowship Fund which is financed by voluntary contributions of a penny a week from employees, and is used for making monthly goodwill gifts to contributors who are absent from work for a month or more, and for gifts to charities.

Run on a purely democratic basis, the Peek Frean Club provides employees with the opportunity of participating in games and social functions, and mental relaxation is provided through a well-stocked library.

The firm recognise that modern industrial life can be satisfying only where it is realised that an industrial unit is also a social unit. At work and at leisure, employees are encouraged to develop their potential to the utmost and to participate fully in the affairs of their company and their club.

Abstracted from "Personnel Management and Welfare."

Correspondence

To the Editor of
FOOD MANUFACTURE

Hygienic Fish Handling

DEAR SIR,—In connexion with the comment on the lack of hygiene in fish handling published in the July issue of FOOD MANUFACTURE, there appear to be three important aspects. The first is that we have yet to learn that it is useless to talk about the education of the worker, so long as the employers themselves are ignorant of the first principles of hygiene; this means that more technically qualified men must be placed on boards of directors. Far too much importance is still placed on financial knowledge in the selection of board members.

The second is that the fishing industry has been reorganised during the last fifty years, which means that its hygienic control must be brought up to date far more rapidly than has been the case. This improvement in hygiene is probably required more in the distribution to retail shops than in canning and similar factories.

Thirdly, fish spoilage organisms fortunately develop far more readily on fish than do those pathogenic to man, so that there is not the same necessity to fear for human health with fish as there is with meat.

Yours faithfully,

THOS. MCLACHLAN,
A.C.G.F.C., F.R.I.C.

London.

Solvent Extraction of Soya Bean Oil

High efficiency in oil removal from soya beans may be attained by continuous solvent extraction methods. While Hexane has been used mainly for the extraction of oil seeds for many years, several considerations indicated the desirability of non-inflammable solvents. Bearing this in mind, a new process has been developed and is fully described in a paper by O. R. Sweeney and A. K. Arnold of Iowa State College.

OF THE non-inflammable solvents, the chlorinated hydrocarbons appeared to offer the most promise in this respect, and their characteristics were carefully studied, resulting in the adoption of trichloroethylene. One disadvantage was its high cost; although this may have little effect on the process costs, the cost of the solvent lost per unit is an important item. It was clearly recognisable that low solvent loss was one of the necessary goals of the new process. A disadvantage, more apparent than real, is the toxicity of trichloroethylene,[1] but this can be easily dealt with in a properly operated extraction system.

Work was carried out at the Iowa State College on several pilot plants, from which a commercial plant has been developed. The equipment is now being produced in units with a daily capacity of 25 tons.

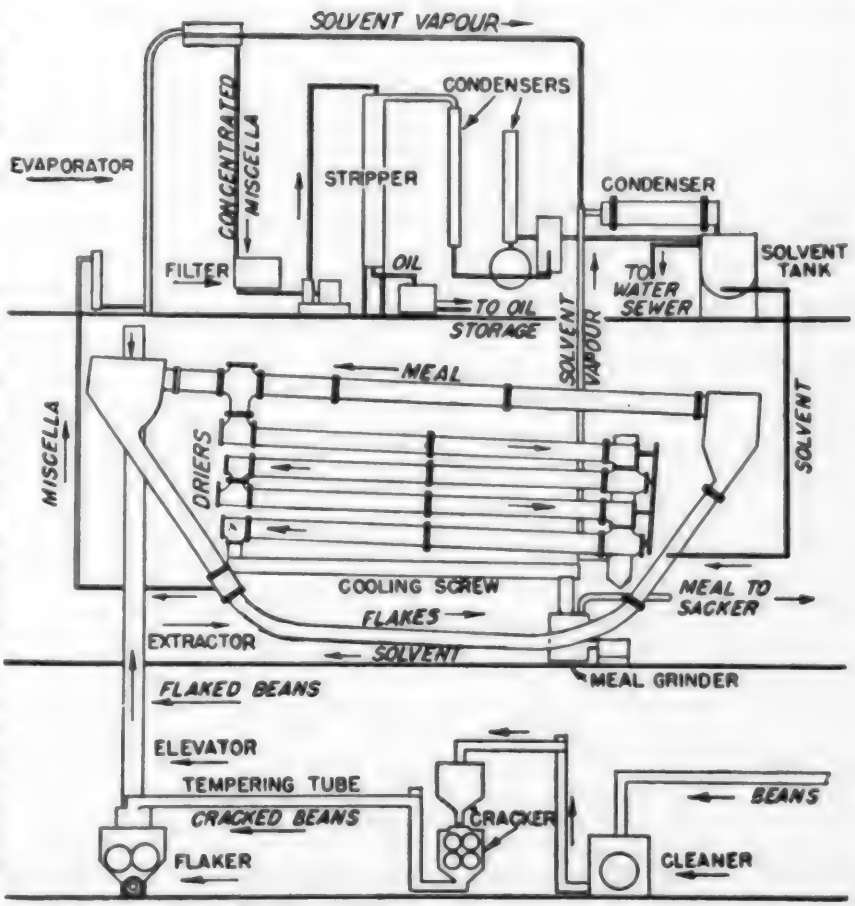
Operation of the Plant

The beans from storage pass over a rotary screen and a permanent-type magnetic separator to remove foreign matter. They are automatically weighed and fed *via* a bin into a two-pair set of cracking rolls. An electrically operated vibrating feeder appears to give the best control. The cracked beans are then passed through a steam-jacketed tempering tube where they are heated to about 150° F.; from here they are dropped, hot, into flaking rolls, and flakes of about 0·01 in. thickness are produced.

The flakes are conveyed by a screw conveyor to a drag-type vertical elevator, where they are raised to the top of the extractor. The flakes enter the extractor just to the right of the drive sprocket, feeding in by gravity. Experimental work has shown that the unextracted flakes absorb the trichloroethylene vapours, but allow any air to pass through. The proper flake level is secured by maintaining a slight overflow which accumulates in a bin from which it may be fed back into the feed conveyor when necessary. An "electric eye," actuating a light or a bell, may be installed in the feed spout to give warning if the level of the flakes drops too low.

The solvent is pumped through a rotameter into the extractor tube at the opposite end from the flake entrance. The miscella flows out through slotted screens in the side of the extractor tube below the point where the flakes enter. The flakes are carried down through the solvent and up out of it into the upper steam-jacketed preheating section.

The hot solvent-saturated extracted flakes or meal drop into the upper drier tube, where volatilisation of the solvent begins. The hot chain passes down into the extractor preheating the incoming flakes and the outgoing miscella. Proper heating of the flakes prevents condensation of moisture on their surface which might otherwise result in clogging of the miscella screens. Heating of the miscella at this point assists



Flowsheet of the extraction process.

extraction and, since it lowers the viscosity, it also ensures better flow of the miscella out through the screens.

Drier Sections

The regular drier sections are steam-jacketed tubes, through which the meal is carried by ribbon-type screws equipped with special agitators. The solvent and water vapour are taken off at one end of the drier, passing under a water spray to remove any meal dust, and to a water-cooled condenser. The condenser is set below the level of the lower drier to facilitate the flow of the heavy solvent vapours into it. The condenser is vented into the incoming flakes above the extractor to allow the non-condensable gases to escape to the atmosphere without loss of the accompanying vapour.

The condensed solvent and water run into a tank, where the solvent separates as the lower layer. The solvent is pumped from the bottom tank back into the extractor. A layer of water is maintained over the solvent to act as a seal to prevent loss by volatilisation.

The meal leaves the lower drier section through a special vapour seal. The plug of meal which acts as the seal is being continuously formed by the discharging meal at the drier end and continuously breaking up as it emerges to drop into the moistening and cooling trough, where water is sprayed on to adjust the moisture content. From here it drops into a hammer mill, where it is ground to proper size to meet trade requirements.

The miscella from the extractor contains about 20 per cent. oil and 80 per cent. solvent by weight. It passes into a climbing film type of evaporator consisting of a series of vertical steam-jacketed tubes discharging into a rectangular flash chamber. The miscella from the flash chamber contains about 80 per cent. oil and 20 per cent. solvent. It now passes down through a leaf-type of filter, where the fine meal is removed. Since there is practically no agitation to break the flakes in the extractor, the percentage of fines produced is small, about $\frac{1}{2}$ lb. per ton of beans processed.

Final Removal of Solvent

The filtered concentrated miscella passes through a preheater to a packed column stripper in which the remainder of the solvent is removed. This stripper consists of a vertical steam-jacketed tube filled with Berl saddles over which the miscella film moves downward. Steam blown in at the bottom strips the solvent from the oil. The solvent and water vapour are condensed in a double condenser system, which not only condenses the two vapours but breaks up any emulsion which may form as a result of colloidal oil droplets carrying over with the water vapour. The solvent goes to the solvent tank for re-use. The oil collects in a small tank below the stripper, from which it is pumped to an outside storage tank.

Control System

The operation and control of the plant are simple, the various individual operations being independently adjustable. The flake thickness is checked by micrometer calipers and the rolls adjusted accordingly. The concentration of the miscella going from the evaporator to the stripper may also be checked from the specific gravity. The presence of solvent in the oil may be determined by the plant operator by a simple colorimetric process[2] using pyridine and sodium hydroxide as reagents. This method as originally developed would determine amounts of trichloroethylene in soya bean oil as low as 0·02 per cent. A modification of this method which may be used to detect amounts as low as 10 p.p.m. (0·001 per cent.) is now in use.

Final Products

Oil produced by this method is substantially free from solvent; no taste or odour is noticeable. The heat treatment of the meal in the driers may be varied, depending upon the use of the meal. Studies under way on the use of the meal as an adhesive indicate its suitability for this purpose. It is also being used experimentally in the production of plastics.[3] While meal with a urease content suitable for feed purposes has been made directly in the pilot plant driers, it is considered more practical in the commercial installation to use a "toaster" which has been recently designed. Feeding tests have shown the meal to be free from any toxic effects and to be entirely satisfactory as a protein food.

Economics of the Process

Processing costs are low. Since the solvent is non-inflammable, the plant can be arranged compactly on one floor in a single building. Automatic operation enables two men to operate a 25 ton plant, including the sacking of the meal. Total power consumption is about 32 kWh. per ton of beans. The process steam required for the driers, evaporators, and stripper is about 1,300 lb. per ton. The water required will vary with the temperature but is about 200 cu. ft. per ton. Solvent loss is low—about $\frac{1}{2}$ gal. per ton of soya beans processed.

Future Research

Research is still being carried out at Iowa along two broad lines. The first is to improve the present process and reduce the residual solvent in the oil still further. The second is to apply this process to the extraction of other oil-bearing materials such as corn and wheat germs, flax, and cottonseed.

Journal of the American Oil Chemists' Society, **26**, 12, 1949.

REFERENCES

1. Lehman, K. F., and Flury, F. (translated by King, E., and Smyth, H. F.): "Toxicology and Hygiene of Industrial Solvents," Williams and Wilkins, 1943.
2. Arnold, L. K., and Hollowell, A. G.: "The Determination of Small Amounts of Trichloroethylene," *Iowa Academy of Science*, 1947, **54**, 181-183.
3. Arnold, L. K., and Quackenbush, A. D.: "Plastics from Soya Bean Meal and Furfural," *ibid.*, 1940, **47**, 231-234.

TO AUTHORS

FOOD MANUFACTURE is prepared to consider the publication of any books on scientific and technical subjects which authors might care to submit.

News from the Industry

FORTHCOMING EVENTS

Chemical Works Safety Conference

A Chemical Works Safety Conference is to be held at Scarborough from September 29 to October 1, under the chairmanship of Mr. J. Davidson Pratt, C.B.E., M.A., B.Sc., M.I.Chem.E., F.R.I.C., director of the Association of British Chemical Manufacturers.

Detailed arrangements for the conference are being made on behalf of the A.B.C.M. by the Royal Society for the Prevention of Accidents, 131, Sloane Street, London, S.W.1, to whom application should be made for the necessary membership form.

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Electricity as Production Aid

In order to make available to industry the most up-to-date information concerning the contribution that factory electrification can make towards increased production, the Utilisation Section of the Institution of Electrical Engineers are holding a conference on "Electricity as an Aid to Productivity" on November 15 and 16.

Mainly intended for executives in both large and small factories who are responsible for production, the conference will consist of a series of lectures, each followed by a general discussion. The lectures will cover, in general terms, what electricity can do to increase production rather than give full technical details of the apparatus with which these improvements can be achieved. The subject matter of the lectures will come under the following broad headings: (*a*) motive power in the factory; (*b*) industrial heating processes; (*c*) welding applications; (*d*) the handling and inspection of materials; and (*e*) lighting, heating, ventilation, etc.

Nickel Alloys

An interesting heat-resistant use of Inconel is described in the current issue of *Wiggin Nickel Alloys*, which contains an article on Diesel engine exhaust systems in this material.

Other articles in this booklet, distributed by Henry Wiggin and Company, deal with nickel in water meters, Monel steam accessories and oil filters, a corrosion-resistant type of thermometal, and K. Monel propeller shafts.

Surface-active Compounds

Among the most important chemicals developed from petroleum are surface-active compounds or detergents which are characterised by their wetting and cleansing properties.

Scottish Oils, a subsidiary of the Anglo-Iranian Oil Co., began manufacturing a surface-active compound from shale oil at their Pumpherston refinery in 1948. This detergent, which is a sodium higher alkyl sulphate, is marketed industrially by Irano Products under the trade names Comprox "A" (liquid) and Comprox "T" (paste).

Mobile Lighting Showroom

To provide facilities in areas where it is not always convenient to visit a showroom, Crompton Parkinson now have a mobile unit equipped with representative lighting fittings.

More than thirty different types of lighting fittings are contained in the unit, and special prominence is given to the more recent developments. A variety of types of reflectors for industrial lighting either by fluorescent or filament lamps are available for inspection.

The new Louvalite fluorescent lamp and decorative fittings are mounted on the ceiling and wired up for connexion to a convenient electricity supply so that the actual illumination obtained in practice can be demonstrated.

To provide for different supply voltages, a Variac transformer control is installed; this can be connected to any electricity supply from 200 to 250 A.C. volts to give an output of 230 volts. For direct connexion to an external 230 volt A.C. supply, a changeover switch is fitted.

Margarine and Cooking Fats

SCHEME TO RE-INTRODUCE BRANDS

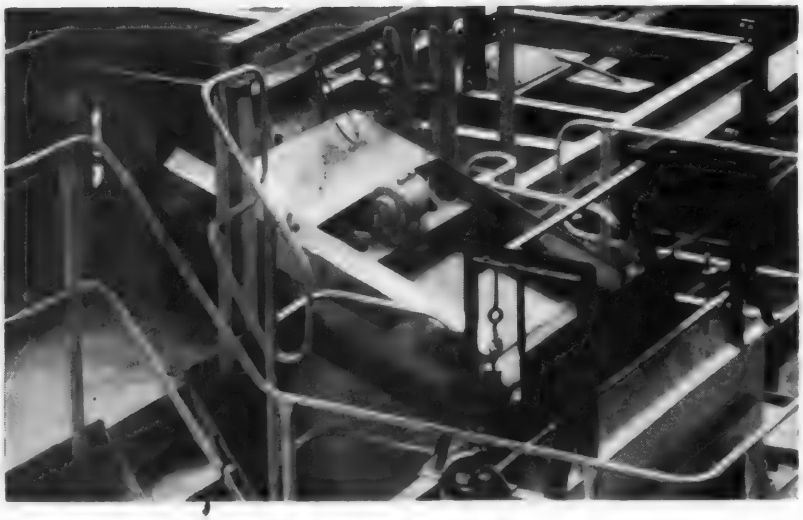
The attitude adopted by the board and the steps taken in trying to restore greater freedom of choice and bring back to the market branded margarine and cooking fats were described by Mr. J. P. Van den Bergh, chairman of Van den Berghs and Jurgens, at the company's recent annual general meeting.

It was perhaps understandable, he said, in view of the country's economic position, that the Government so far had not permitted the necessary expenditure of foreign currency to be made to provide a supply of oils and fats sufficient to justify the removal of rationing. It seemed clear from the Government's own statement that the supply position in the country could not fall very short of the point when rationing could be removed. The Minister of Food stated recently that as much as 10 per cent. of the domestic margarine ration was not being taken up, but it should be remembered that the bakery trade was still getting only about 60 per cent. of what it used before the war; the question was therefore whether the surplus of domestic supplies would be sufficient to supply the deficiencies of the bakery and other trades. It seemed, however, that we were approaching the stage where demand and supply were almost equal.

When this situation began to develop some twelve months ago, the board felt that the time had come when, even if rationing had to be continued, it was right to press for the return of branded products and to restore to the industry the element of competition.

Together with officials of the Ministry of Food and other manufacturers, a scheme had been devised for the re-introduction of brands, under which higher grade margarine and cooking fat might be sold at prices above the current level. The quantities to be made available would be governed by the availability of higher grade raw materials. In this connexion Mr. Van den Bergh reminded his audience that although margarine today cost the consumer 10d. per lb., it was subsidised by the State to the extent of 4½d. per lb. The prices at which the higher qualities would be marketed would virtually eliminate the subsidies on the quantities so sold, which would mean that manufacturers who wished to compete for this trade would have to produce a quality which would appeal to the public and sell on its merits.

These proposals were understood to be now under the active consideration of the Ministry of Food.



Vibrating equipment for use with storage and feeding hoppers.

Industrial Vibration Equipment

For use with storage and feeding hoppers of all sizes, screens and sieves, vibrating conveyors, and trunking systems, the Allam industrial vibrating equipment is based on the Trillor electric vibrators, the four types available giving a wide variation in power and vibration amplitude, and on the variable amplitude mechanical vibrators.

The electric vibrators embody totally enclosed squirrel cage electric motor wound for all standard single and 3 phase alternating current supplies, and they are dirt-, dust-, and damp-proof. The mechanical vibrators are also totally enclosed, and provision is made whereby the amplitude can be adjusted for driving either by V-belt from a separate motor or belting system from existing shaft, or by a flexible cable shaft.

Materials subjected to vibration may range from custard powders and flours to very sticky and cloggy materials.

Visit to Sheffield Cannery

Members of the Stoke-on-Trent and Districts Wholesale Multiple Grocery Trades recently paid a visit to the Sheffield factory of Batchelors Peas. They were welcomed on arrival by the chairman, Lt.-Col. M. W. Batchelor, J.P., Mr. F. W. Sadgrove, marketing director, Mr. J. C. W. Stead, works director, and Mr. J. E. Pearce, sales manager, and conducted on a tour of the factory.

At a luncheon which followed at the Grand Hotel, Sheffield, Mr. P. Cox, President of the North Midlands Wholesale Grocers' and Provision Merchants' Association, proposed a vote of thanks. In his response, Col. Batchelor made reference to the growth of the English fruit and vegetable canning industry, and said it was a great disappointment that tin allocations to canning firms were to be cut by 10 per cent. He concluded by saying that, with the support of the Government, the future of the English canning industry could be very bright.

Afterwards, a recently completed film, depicting the strict quality control that Batchelors exercise over all their products, was shown to those present.

Stitching machine for boxmaking.

Purchasing Officers' Association

Two successful luncheon meetings were held recently by the Purchasing Officers' Association in Birmingham and London, when addresses by the Presidents of the Birmingham and London Chambers of Commerce respectively were given.

In Birmingham, Mr. James Leek, C.B.E., referring to the important role which purchasing played in industry, said that before they could receive export buyers British buyers had to ensure that they were able to quote competitive prices in the world's markets. Mr. Leek expressed concern at the fact that the demand from overseas for capital equipment to be supplied by Great Britain was steadily growing. This would lead to increasing competition in the future, as overseas countries, having bought the machines, would not want to buy U.K. plant when they could make it themselves.

In London, Sir Frank Nixon, K.C.M.G., C.B., said that good buying was one of the main factors in the rise of England's commercial greatness. Because the U.K. was an honest buyer, and the foreigner had confidence in the fair treatment he would receive, sterling became the world's money. Great Britain's strength lay in individualism, which had been built up on the work of its buyers, and Sir Frank deplored the practice of bulk buying.

Stitching Machines for Boxmaking

Developed to meet the particular requirements of the food packaging and canning industries for high-speed packing of their products, several new stitching machines have been put on the market this year by British Brehmer. Foremost among these are the bottom flap container stitcher and top flap container sealing machine, both of which are equipped with the 85 rotary cam stitching head which gives maximum stitching results at high speed over long periods.

Using broad flat wire, sealing by small, strong stitches, each measuring $\frac{3}{8}$ in. along the crown, provides a method which is pilfer-proof and immune to climatic conditions. Up to 400 containers per hour can be bottom stitched, prior to the cases being filled.

The Superfast rigid box stitcher and two other models of rigid and folding box stitchers are also made by the company; all these work at high speed, and 300 stitches per hour can be inserted in the making of cardboard boxes and containers.

Roaster-coolers

The rotary louvre principle of drying developed by Dunford and Elliott has been applied to the processes of roasting and cooling in addition to its other applications in the food industry.

The company's rotary louvre roaster may be of particular interest now that restrictions on the importation of nuts into Great Britain have been removed. A cooling section is fitted at the end of the roaster to arrest the roasting process and ensure that auto-roasting of the nuts is prevented. The smallest roaster handles a minimum capacity of 4 cwt. per hour of such nuts as peanuts or hazelnuts, and larger sizes are available.

Whereas the standard design of roaster is suitable for nuts, cocoa nibs, and suchlike, a special roaster-cooler is available for coffee and cocoa beans.

X-ray Inspection of Foods

Special X-ray equipment for the visual inspection of food and other consumer products provides a versatile and certain method of detecting foreign inclusions such as ferrous and non-ferrous metals, rubber, stones, or glass, many of which cannot be detected by any other system.

Developed by the industrial X-ray department of Philips Electrical, the equipment is being used for the examination of such varied commodities as frozen meat, bars of chocolate, sausages, Christmas puddings, and packaged cereals; packets of biscuits may be inspected for minute inclusions of foreign bodies at the rate of 5,000 packets an hour.

The type of installation is naturally dependent upon the nature and shape of the commodity to be examined, the principal consideration being to project the largest area of the commodity on to the fluorescent screen. In a typical installation, the product to be examined is conveyed through a dark booth where it is observed by the inspector as it passes over the X-ray system. Should any impurities be revealed, the inspector, by means of a simple trigger mechanism, quickly rejects the contaminated product. In this way the speed of the examination can be made to keep pace with the production rate.

Plant in New Liner

The closed feed system installed in the new 24,000 ton P. and O. liner *Chusan*, with regenerative condensers, turbine and electrically driven feed pumps, and an extensive patent evaporating and distilling installation for providing fresh water from sea water for boilers and domestic use in the ship, have been provided by G. and J. Weir.

The regenerative condensers are each capable of handling 106,595 lb. of steam an hour when maintaining a vacuum of 28½ in. Hg, and are efficient de-aerators. Having been freed from corrosive gases the condensate is delivered at vacuum temperature to the closed feed circuit from which all air is excluded, and passes through the feed pumps back to the boilers. Closed feed controllers in the base of the condensers regulate the flow of condensate to meet the demands of the feed pumps; these pumps are controlled by four Robot feed regulators, which maintain the boiler water level within close limits and respond instantly to any change of power when manoeuvring.

The condensate from the turbo-generators is also taken to the main condensers for de-aeration when the ship is at sea, but for manoeuvring and harbour use an Optimum de-aerator is installed.

The evaporating and distilling plant, which comprises three single-effect salt water evaporators and one fresh water evaporator, will supply all the fresh water requirements of the *Chusan* from sea water at a lower cost than shore water, and also releases valuable space for cargo.

In addition to these main items of equipment there are numerous other Weir auxiliaries such as H.P. heaters, pumps for various uses, drain coolers, air ejectors, gland steam condensers, and other heat exchangers.

Cocoa, Chocolate, and Confectionery

Although the failure of de-rationing somewhat clouded the year for the Cocoa, Chocolate, and Confectionery Alliance, whose annual report for 1949-50 was recently published, it gave grounds for believing that the industry could look forward to a considerable market for its products when controls were removed.

Certain real improvements in the past few years, and especially in the last twelve months, had been effected; food generally had become more plentiful, both in quantity and variety. The year had also seen the industry's own collective buying organisation, W.T.A. (Supplies), brought into use for the purchase of glucose and fats, and record exports had been made, especially to hard currency markets.

There were, however, three uncertain factors. Firstly, hopes of improving sugar supplies had not yet materialised; secondly, there was the ever-present menace of the swollen shoot disease of cocoa in West Africa; and lastly, the industry's export trade to hard currency markets was precarious, for it depended largely upon factors which the industry itself could not control, so that it was impossible to be assured that past performance could be maintained in 1950.

X-ray equipment being used for the inspection of tinned food products.
Courtesy H. J. Heinz Co.

Floor life is lengthened by the use of cast-iron honeycomb floor plates.

Heavy Duty Floors

Long life of floors under severe conditions of trucking and heavy loads is ensured by the use of the patent cast-iron honeycomb floor plates manufactured by Guest Keen and Nettlefolds.

Truck wheels run, not on the concrete itself, but on cast-iron honeycombs embedded in the surface of the floor. The floor plates thus afford maximum protection against incipient wear and tear on the surface, and so against the cracking from which concrete disintegration spreads. In addition, the honeycombs preserve the non-slip properties of the concrete floor, provide a dove-tail key which prevents the plates from working loose or buckling, and eliminate the network of weak joints as between flags.

Director's Business Tour

Colonel M. A. McEvoy, managing director of Bamag, left recently for a tour to the Middle East, Pakistan, and India to inspect some of the chemical and vegetable oil plants recently completed by the company. At the invitation of the Government of Ceylon he spent a few days in Colombo to discuss matters connected with the industrialisation of the country. He broke his outward and return journeys in Greece and Cyprus respectively to take part in discussions on plans for industrial expansion.

Supply Minister's Visit

The Rt. Hon. G. R. Strauss, P.C., M.P., Minister of Supply, and members of his staff, recently visited the works of Hopkinson's, Limited, at Huddersfield.

The Minister was conducted round the works by the chairman and managing director, Mr. R. L. Brown, and was shown the various progressive stages in the manufacture of boiler mountings and valves from the foundries to the final exacting tests and assembly of details of motorised equipment.

At the conclusion of the tour the Minister took part in an informal discussion with the works joint production committee.

Tattooed Poultry

One of the main difficulties in bringing prosecutions against suspected poultry thieves is the absence of positive identification of the stolen property. The Poultry Committee of the National Farmers' Union have accordingly instituted a scheme for the registration of poultry by means of a tattoo mark allotted to the owner in an effort to reduce the increasing number of thefts. A similar scheme for the registration of poultry has been in operation in the United States and Canada for some time and has proved very successful.

The tattooing instrument consists of a pair of parallel pliers with needle-like teeth, between which the web of the bird's wing is pierced. Tattooing ink-paste is then rubbed into the impression and a permanent mark is left. The process of tattooing birds is simple and two men can easily do 120 an hour.

The registration scheme is to be known as the National Poultry Identification Register, and poultry keepers are invited to apply for a registered mark to be allotted to them. The rate of subscription is 35s., which includes the cost of the instrument and ink-paste as well as the registration fee. All registrations will be recorded at N.F.U. headquarters, 45, Bedford Square, London, W.C.1, where a central register will be kept. In addition, registrations made within a particular county will be recorded at the respective N.F.U. county branch office as well as being notified to the Chief Constable of the appropriate police force.

The scheme, which is not confined to members of the N.F.U., has received the general approval of the Ministries of Agriculture and Food and has been recognised and approved by the Home Office.

Packaging Developments

Tests have been started in South Africa to measure the effect of various kinds of packaging materials on the flavour of eggs, it is stated in a recent issue of *Packaging Abstracts*.

Freshly ground coffee wrapped in a specified transparent film keeps its original freshness for 90 days, it is reported in one item, and a new packaging material is claimed to prevent foods losing aroma and becoming tainted with the odours of foods stored nearby.

A development in the transport of frozen foods is the use of sealed packages which are placed in a specially insulated corrugated aluminium container reduced to $-120°$ F.; this keeps them below 0° F. for as long as 40 days without additional refrigeration.

Changes of Address

The address of Wynmouth Lehr and Co. is now: 2, Thames House, Queen Street Place, London, E.C.4. (Telephone: City 4737/9.)

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The registered office and factory of the Tyne Truck and Trolley Company are now at First Avenue, Team Valley Estate, Gateshead-on-Tyne, 11. (Telephone: 77104.)

Automatic Continuous Fillers

Their latest patent automatic continuous filling machine for soups, jams, jellies, marmalades, and similar free-flowing food products, is manufactured in two sizes by Robert Kellie and Son, one for filling 2 lb. and 1 lb. jars or cans at the rate of 30 to 60 containers per minute, and the other for filling 7 lb. jars or cans at a speed of 20 containers per minute or 14 lb. containers at 10 per minute.

The filler for 2 lb. and 1 lb. jars or cans is provided with 31 patent roller bearing carriers, but 19 or 25 carrier machines are available. This model permits skimming and tissuing to be performed on the delivery side without removing the filled containers. Micro-regulation of the fill is provided, the controller of which operates a quick-change gear whereby the filling range of the pump is infinitely variable between the maximum and minimum filling capacity of the machine.

In order to obviate the trouble of crystallisation of the product on cylinder walls which occurs in models employing pistons or plungers, all reciprocating movements in these new machines have been dispensed with in favour of the rotary continuous streamlined flow, which provides a steady continuous supply of the product handled, without pulsation, churning, or aerating, to the revolving nozzle head. Silent in operation, the machines fill cleanly and regularly without splashing or dripping jam on the outside of the containers, and whole soft fruit jams are filled without crushing the berries.

The electrical equipment with the whole of the volumetric displacement and pumping mechanism is contained within the framework of the machine, the product being measured and pumped to the nozzle head through a metal telescopic feed pipe, and automatic electrical interlocks prevent spillage and overfilling.

Corrigendum

We are informed by the Talbot Stead Tube Co. that in their communication (published in FOOD MANUFACTURE, June, 1950), in which it was stated that their fittings were "being manufactured according to the British Standards specifications for milk tube fittings," the word "draft" should have appeared before "British Standards," as the specifications have not been finally approved.

Automatic continuous filling machine for such products as jams, jellies, marmalades, and soups.

Liquid Leak Detector

A new method of detecting leaks on refrigeration systems using refrigerants miscible with oil, such as Freon, methyl chloride, and sulphur, has been developed. Following the introduction into the system of Seeleke liquid leak detector, an easily seen vivid red stain appears at leaky joints.

Uniform Drying

Scientists engaged on crop research work require drying equipment up to laboratory standards of accuracy, but much larger than standard laboratory driers, so as to enable them to test approximately 100 samples at the same time. The Unitherm laboratory drier was designed by the Birmingham and Blackburn Construction Co. for this purpose. Its chief features are: equal distribution of air and heat to all parts of the interior; 10 kW. heater controlled by a thermostat, with a differential of 2° C.; forced air circulation by centrifugal fan; and interlock switch fitted to door fastening, which cuts off current to fan and heaters when the doors are opened. Insulated panels 2 in. thick are used in its construction.

This equipment may be used for the production of meringue cases, its adaptation for that purpose involving the use of a 12 kW. heater to give a maximum temperature of 250° F., and an increase in the drier's dimensions to accommodate 45 trays, 36 in. by 18 in. each.

Pump Developments

Positive self-priming valveless rotary pumps delivering up to 1,000 gallons of clean water per hour at heads up to 100 ft. are among the wide range of electrically driven centrifugal pumps made by the Pulsometer Engineering Co. Centrifugal pumps for small duties include the "Midget," with a capacity up to 2,100 gallons an hour and heads up to 270 ft., for circulating, boosting, boiler feeding, sump and well feeding, supplied with baseplate and flexible coupling, and belt or vee-rope drive.

The milk cooling plant with stainless steel hygienic cooling surface also manufactured by the company will cool milk continuously from 90° F. to 40° F. Two important features are the stainless steel smooth cylindrical coolers and the safety device which enables the cooler to be sterilised safely without removal. The vacuum pumps used are easily dismantled.

The Unitherm laboratory drier.

String Opening Composite Pack

Ideal for packing such products as baby and invalid foods, custard powders, cocoa, confectionery, and biscuits, the new string opening composite container is similar in construction to a normal composite container, having the lid seamed to the body, and being filled from the bottom. Just below the top seam a rip cord projects from the container. To open the pack a sharp pull on the rip cord cuts through the prepared wall of the body, and the lid then becomes a normal plug lid which can be removed.

The pack is tamperproof, is easily opened, and possesses an effective reseal. It can be supplied either lined with foil or with plain white board, according to the nature of the contents. The Metal Box Company are the sole licensees in Great Britain.

Pension Society Report

Thanks to Mr. W. Pitt, chairman of appeal for 1949, by whose efforts the sum of £8,800 was raised, are recorded in the seventy-fourth annual report of the Journeymen Bakers' and Confectioners' Pension Society.

There are now a total of 158 pensioners on the books; a number of enquiries have been received as to whether the age limit could be raised, but no definite decision has yet been reached.

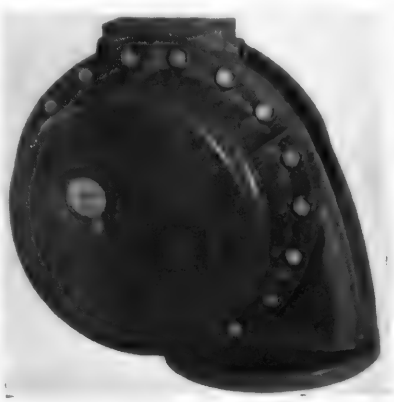
The Committee also offer thanks to the subscribers for their continued and generous support.

Precise Tank Gauge

For use at oil refineries, chemical works, and other industrial plant where exact indication of quantities is an important factor, the Precise tank gauge recently placed on the market by Evershed and Vignoles is a null point displacer system gauge for local and remote indication of liquid level in tanks.

The new gauge marks a distinct advance on float-controlled systems. The transmitter is, in effect, an automatic dipstick installed on the top of the tank, and readings are accurate to within one-tenth of an inch irrespective of range. A local indication is given, and the reading is also transmitted to distant receivers which have double concentric dials normally marked in feet and inches.

A feature of the system is that zero adjustments on the transmitter can be made without breaking the flameproof jointing.



Fine Drinking

The interest shown in their booklet, *Fine Drinking*, has encouraged the French houses of Ayala, Croizet, and Rocher to send an invitation to visit them this year to anyone who may be taking a holiday on the Continent. They have also issued a coloured map of France showing the districts from which the most famous wines come, and a copy of this may be obtained from Blumenthals, Ltd., 125, Pall Mall, London, S.W.1.

"Fly About the House"

Another film to aid the Government's campaign for clean food has been produced by the Central Office of Information for the Ministry of Health. Under the title of *Fly About the House*, this coloured cartoon film deals with the dangers of contamination of food by flies.

Local authorities can borrow copies of the film without charge from the Central Film Library, Imperial Institute, South Kensington, S.W.7, for free showing during local clean food campaigns.

In a circular to local authorities, the Ministry of Health has suggested that this film should be shown with the earlier C.O.I. film *Another Case of Poisoning* in programmes arranged for food handlers.

Changes in Representation

Mr. L. E. C. Stewart, south-western representative of Vokes, has now taken over, in addition, the representation of the company's midland area.

Mr. E. J. Lawrance, who has handled the firm's products for some years in the south and South Midlands, now includes Norfolk, Suffolk, and Cambridge within his area of representation.

*

Their resignation has been tendered by Reads, Ltd., to the Lima-Hamilton Corporation in respect of the latter's sales agency for many countries in Western Europe and North Africa.

*

Mr. R. J. Gardner, who has represented Stevenson and Howell in Ireland for the past 37 years, has relinquished his duties in that territory. His brother-in-law, Mr. R. J. Harris, has been appointed in his stead.

Mr. Gardner, whose service with the company covers a period of over 50 years, will continue to represent the firm in the Birmingham area.

Appointments

Mr. M. R. Neville, M.C., M.A., A.M.I.E.E., has been appointed manager of the publicity organisation of the G.E.C. in succession to Mr. C. Pinkham, who retired on June 30.

The company have also appointed Mr. W. J. Bird as sales manager for the London area, which includes responsibility for branches at Ipswich, Southampton, and Plymouth, and sales depots at Brighton, Canterbury, Croydon, Luton, and Reading.

*

The first President of the newly formed Refrigeration Servicemen's Association is Mr. Cyril B. H. Fentiman, A.S.R.E., A.M.Inst.R., a director of Rocke International.

Mr. T. Archbold and Mr. V. J. Daly have been appointed chairman and hon. secretary respectively.

*

Mr. C. J. Life, who has been on the staff of Mark Mayhew Limited, flour millers, for fifteen years, has been appointed Deputy Mayor of the Borough of Wembley. He has been a member of the Wembley Council since 1927 with a break of only one year in his service.

*

Mr. L. J. E. Hooper has resigned his position as joint managing director of Doulton and Co., but will still retain his office as chairman.

The board have appointed Mr. E. Basil Green to be managing director of the company.

Canning Industry in Aberdeen

Following upon the recent activity of local firms in developing food production, a tin box making industry has been established in Aberdeen. To date the bulk of production has been handled in wooden boxes, but the development of a canning industry on a large scale is now envisaged.

The new company, Willowdale Metal Boxes, is concentrating on cans for fishing industry purposes. Initial production capacity is in the region of 15 million boxes per annum.

Shortage of tins has caused considerable difficulty to some Scottish firms, especially where the product is confined to home trade, and in Hillington, Glasgow, one firm of soup manufacturers has been forced to close down temporarily because of this shortage.

Sweden Buys British Trucks

A contract with an important Swedish concern for the supply of 100 Stacatrucs with lifting capacities of 20 cwt. and 30 cwt. respectively and ancillary equipment, etc., to a value of £125,000 was recently signed by Mr. R. T. Hartmann, managing director of I.T.D.

These fork lift trucks are manufactured by the associated company, Austin Crompton Parkinson Electric Vehicles.

Belgian Food Imports

A report on the market in Belgium for imported manufactured foods has been issued by the Commercial Relations and Exports Department of the Board of Trade. Full details are given of the extent of the market; the markets for jams and preserves, canned vegetables and soups, sauces, pickles, and similar condiments, and miscellaneous foods; method of distribution; competition; and advertising.

In conclusion it is stated that, in a market as competitive as Belgium, hard and imaginative work is needed to sell any article, and U.K. firms are recommended to visit the country themselves in order to assess requirements of buyers and watch marketing methods. Those needing assistance concerning the marketing of food products are invited to communicate with H.M. First Secretary (Commercial), British Embassy, Brussels.

Railway Standard Charges

Based on the recent railway rates increases, the revised Standard Charges Scale which has now been republished gives at a glance the present charges for all classes of goods for mileages up to 750 miles.

In addition to the station to station rates for classes 1 to 21, the carted and/or delivered rates are also shown for classes 11 to 20.

Thus by a single reference to the mileage, the actual present-day rate is obtained without any calculation.

Scottish Fruit Growers Complain

Prospects of a glut of Scottish tomatoes in July and competition against large imports of low-priced imported tomatoes are worrying Scottish growers. Efforts made to obtain a clear statement of Government intentions have met with no success. At present 7,200 tons of foreign-grown tomatoes are scheduled for July; the effect of such imports will be to ruin the market for the home-grown high quality product, especially in view of public demand for lower prices.

Raspberry and strawberry growers are also complaining that Government imports of Dutch pulp are being subsidised and resold to jam makers at cheap prices on long credit.

The yields from all types of crops, particularly raspberries and strawberries, are expected to be small owing to weather conditions.

Industrial Bacteria

NATIONAL COLLECTION AT RESEARCH LABORATORY

In order to provide industry and research laboratories with the cultures they need, a national collection of industrial bacteria was begun at the Chemical Research Laboratory, D.S.I.R., early in the year. The Laboratory took over the non-pathogenic cultures held by the National Collection of Type Cultures at Colindale and now houses some three hundred and fifty types. This number is expected to increase considerably as the collection becomes more representative of the needs of industry.

The Laboratory will maintain any organism which has ceased to be of interest but which may be wanted later. It will also maintain any organism which for one reason or another should be duplicated; cultures may change character at an inconvenient moment, for instance, and this could hold up important work.

Most of the non-pathogenic bacteria supplied up to now by Colindale can be obtained from the Chemical Research Laboratory, which will try to procure any type of non-pathogenic culture it does not hold itself. In time, it is hoped that the collection will become comprehensive, and gaps are being filled by obtaining cultures from other laboratories in this country and abroad. Particular emphasis will be given to assay organisms.

Cultures held by the Laboratory will be included in the United Kingdom List of Species to be published in 1951. Enquiries or requests for cultures should be addressed to the Director, Chemical Research Laboratory, Teddington, Middlesex.

Biscuit Factory at Cinderford

UNCONVENTIONAL DESIGN PERMITS EXPANSION

Completely unconventional in design, the new factory of Meredith and Drew now being erected at Cinderford is based on the disposal of machinery and services ideally in space, with the building constructed so as to house and support them. All windows have been eliminated from certain "conditioned" rooms and a completely automatic ventilation system will be installed.

All the administrative and ancillary departments have been grouped along one side of the main plant line, leaving room for expansion of each individual line of machinery at either end, and also for the possible future installation of additional lines of machinery alongside.

The beginning and end of the general flow line have been "bent back" so as to enable grouping of the receiving point, the despatch point, and the mixing control in the centre of the building; these will all be immediately adjacent to the administrative offices.

Long biscuit ovens are easily affected by external draught, most even baking results being achieved in a factory where the ovens are totally enclosed in a "cellar"; furthermore, rooms situated above this "cellar" are kept warm without cost during the winter. This idea is therefore being perpetuated in the new factory.

Although there will be four main floors in the Cinderford factory, there will be no lifts, provision being made for goods to be loaded and unloaded from three of the four floors. The construction of all the suspended floors conforms to the standard company practice of using longitudinal pre-cast beams which can be easily omitted, removed, or reinstated, to provide for the installation of holes for chutes and conveyors between floors.

The packing room has been sited on a level below the bakehouse, so that direct extension of the plant lines would not give the room the appearance of being cut up into a number of inaccessible strips.

To permit easy cleaning, a heavy roof truss which can carry conveyors, hoppers, etc., has been incorporated.

The main service duct is located under the floor of the bakehouse, which serves the dual purpose of containing all pipes, etc., and at the same time acts as the main ventilation extraction duct. Hot air is fed up through the hollow walls of the building, the 11 in. space entirely accommodating the stanchions and permitting the achievement of a smooth flat wall inside and out. These spaces in the walls also house all pipes including the oven flues, which are carried right up to the ridge to avoid any down draughts.

In order to assist the high standard of hygiene required, there will be distributed round the factory small cupboards called "Sanitarias" containing washing sink and all necessary cleaning equipment.

New Food Premises

A new bacon factory is to be erected by York Hams, Ltd., at Woodnook Farm, Blubberhouses, Wharfedale.

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Factory premises of The Daintee Chocolate Confectionery Co., of Clifton Road, Marton, Blackpool, are being extended.

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Westburn Sugar Refineries, of Drunfrochar Road, Greenock, are planning to extend their refinery at Lyndock Street, Greenock.

▪

Extensions to the fruit packing station at the Essex Institute of Agriculture, Writtle, near Chelmsford, are to be carried out at an estimated cost of £8,700.

New Ice Cream Depot

Four new supply depots situated throughout England are being reopened by Wall's. New premises have been opened at Plymouth to replace an existing depot. A new depot is being opened at Redruth, and pre-war depots will be reopened at Peterborough and Luton.

The firm now operate more than 80 supply depots in Britain; each has its own cold stores and local delivery organisation.

One-day Visit to Amsterdam

Representing a cross-section of the organisation, twenty-six members of Boxfoldia recently paid a one-day visit to Amsterdam. The party was conducted round the works of the Senefelder Printing Co., Amsterdam, in the morning, and there was opportunity to compare the British and German makes of machines, to note the economical way in which paper was conditioned above the machines, and to examine the photographic and plate-making equipment.

The afternoon was left free, and a tour of the canals was made in the early evening, after which the party left for home.

Detachable Van Signs

By using detachable signs on their fleet of vans, a Stirlingshire firm have achieved a considerable saving on relettering and painting.

Aluminium alloy flush finished signs, carried out in synthetic stoving enamels, are used. When it is necessary to repaint the vans, all that is required is to remove the rivets holding the signs, which are easily replaceable.

Originated by a Paisley firm making metal signs, the idea has not been developed to date to any extent, but is due for expansion as facilities permit. The makers have experimented over a considerable period to achieve resins which would give the ideal base for resistance and at the same time meet the mechanical conditions of silk screen printing on metal.

A further development is the achievement of a secondary flow of colour during the infra-red stoving of the metal, the colour flowing to cover any slight markings in the initial printing. Such signs have a life of from 5 to 10 years according to conditions and use. Alternatively signs can be provided embossed or otherwise impressed to meet specific needs.

BOOKLETS RECEIVED

A new publication describing Noflote pump controls manufactured by Evershed and Vignoles contains for the first time complete details of the new sensitive pattern relay units used for operation in connexion with relatively clean water. The standard pattern electrodes used for drainage and sewage purposes are also described.

▪

Illustrated articles on "V" fan belts, farm tyre marketing, tyre injuries, service and repair, as well as an interesting article on how users of commercial vehicles can reduce their costs per tyre mile, are contained in the spring issue of *The Goodyear News*.

▪

An article on the building of insulated bodies for ice cream vans in the firm's own workshops is featured in the summer number of *Wall's Magazine*. Van bodies built range from 8 ton articulated vehicles to 10 cwt. electric trucks.

Special devices developed at the Acton bodyshops include a roller conveyor, fitted into the centre of the van floor, for ease of loading, and a winch-operated cradle to enable a driver to change a wheel single-handed. Large containers for transporting ice cream in bulk by rail are also built.

COMPANY NEWS

In the course of his remarks at the twenty-fifth annual general meeting of H.P. Sauce, Sir Patrick Hannon, chairman, said that he felt they were entitled to congratulate themselves on a record of progress and expansion over a quarter of a century. The accounts for the year under review presented a new high record of production and turnover.

The chairman spoke of the friendly relations which subsisted between their group of companies in Great Britain and Lea and Perrins, who still held pride of place in the distribution of Worcester sauce throughout the American Union. Subsidiaries of the company continued to maintain full production, and their Australian company was improving its output. The continued prosperity of their Canadian business was entirely satisfactory.

It was recommended that a final dividend of 9d. per stock unit be made and that transfers be added to various reserves as shown on the profit appropriation statement.

OBITER DICTA

- I feel bullish about meat.—*Mr. Maurice Webb.*
- Perhaps the well-known Webb charm will make the gristle disappear in the housewives' mouths.—*"News Chronicle."*
- Sausage cases are so tough that the best way of handling them is as one would handle a tube of toothpaste.—*Mr. W. A. Steward, M.P.*
- It is Canada's duty to produce all the food she can, and it is Britain's duty to buy it.—*Mr. James Gardiner, Canada's Agriculture Minister.*
- Scotsmen may be horrified to hear that the haggis is considered one of the sausage family.—*Ronald Nicholson in the "Star."*
- When the fly sits on a nice piece of plum cake, he squirts out some digestive juice on to it.—*Dr. H. S. Bury, the Medical Officer of Health for Saddleworth.*
- I see no need to deliver milk before 7.30 a.m. Surely nobody wants to be awakened prematurely by the clink of milk bottles.—*Correspondent to the "Daily Herald."*
- Dates from Smyrna are tramped into boxes by the natives and sold here raw. I often wonder what the bacterial count is of dates.—*Mr. Andrew Stewart, Chief Food Officer, Glasgow.*
- The Ministry of Food, which is presumably still a British organisation, has just purchased £4,000,000 worth of eggs from China.—*Mr. S. W. Alexander in the "City Press."*
- There is now an abundance of food in the world. If that food does not find its way to British plates, it is because Mr. Maurice Webb has neither the wit nor the energy to secure it.—*"Daily Express."*
- In the past few years the flap-doodlers have been able to put their theories into practice. I believe they tried to grow groundnuts. Now they have another little project—keeping hens.—*Viscount Lambert.*
- Every time I look a pig in the face I feel ashamed. We are robbing it of a lot of its daily food and serving it to our customers.—*Mr. C. J. Gay, of Ripon, at the conference of the National Association of Master Bakers, Confectioners, and Caterers.*

Expressing the hopes of the company regarding the freeing of chocolate and confectionery sales from control, Mr. L. J. Cadbury, chairman, presiding at the fifty-first ordinary general meeting of Cadbury Brothers, said that there was good reason to believe that only a relatively small addition to their raw materials supplies would be needed to enable the successful derationing of chocolate and sweets.

At no time during the year under review could they put on sale as much as the public were prepared to buy; nevertheless, the firm's turnover amounted to £20,700,000, an increase of 26 per cent. on last year's figure, and export sales showed a considerable increase.

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The combined turnover of their principal subsidiaries, Huntley and Palmers, and Peek Frean and Co., showed a substantial increase over the previous year, according to Mr. Philip Carr, chairman of The Associated Biscuit Manufacturers, in his statement at the twenty-ninth annual general meeting. This increase, however, was largely offset by the increase of operating and administrative costs.

More biscuits had been distributed in Great Britain than in the previous year, and it had been possible to extend the variety somewhat. The joint delivery service with other manufacturers had enabled the spreading of increased distribution costs.

A final dividend of 5 per cent., less tax, making 7 per cent., less tax, in all on the ordinary shares, was recommended.

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The demand for the Corporation's facilities was fully maintained during the year under review, according to the statement of Lord Piercy, chairman of the Industrial and Commercial Finance Corporation, at the fifth annual general meeting held recently. The zest for re-equipment, for new extensions, and creative enterprise seemed to have diminished over the last two years, and recently for the first time profits as a whole had declined while turnover had ceased to expand in business coming under the Corporation's direct observation.

On the whole, the past year had been a period of consolidation. The Corporation had established a place for itself; its facilities were becoming well known and useful relationships with other institutions had been formed.

World Food News

Parma Canning Fair

The fifth International Canning Fair is to be held in Parma from September 8 to 25, 1950. The number of Italian and foreign exhibitors is expected to be as great as that for last year's fair.

Philippines Sugar Crop

Production of sugar in the Philippines in the 1949/50 crop year has not come up to expectations and is now expected to be somewhat lower than in 1948/49. Unfavourable weather is given as the main reason for the lower estimate—10,000,000 piculs (approx. 1,400 million lb.); this means that the new crop will be about 380,000 piculs lower than the previous crop.

The 1950/51 crop should be better, however, provided the now favourable weather conditions are maintained, according to Mr. G. G. Gordon, secretary of the Philippine Sugar Association.

Research Microscopes

A new series of research microscopes and accessories that permit exhaustive study of a wide variety of specimens have been developed by Bausch and Lomb Optical Company.

Known as the Series "E," all models have an inclined binocular body that can be interchanged with a graduated monocular draw tube for photomicrography, measuring, micro-projection, and other research applications. The draw tube is adjustable and graduated from 146 mm. to 172 mm. in tube length. Three types of substages are also provided for routine, specialised, and critical research.

Other features include a deeply curved arm that allows ample clearance for various specimens and full rotation of the microscope stage, coated optical elements that afford maximum light transmission, and a low position, fine focusing adjustment that is only 70 mm. above the table level.

Among the accessories which were developed especially for atomic energy research, food control, development of new drugs, and biological studies are: condensers for phase contrast and dark field observation, disc polarisers and analysers, a first surface aluminised plane mirror for single reflections and ultra-violet illumination, special slide holders, and illuminators.

Newfoundland Fishing Industry

The United Kingdom Trade Commissioner for the Maritime Provinces has drawn the attention of the Commercial Relations and Exports Department of the Board of Trade to possible developments in Newfoundland's fishing industry.

In his speech introducing the Budget for 1950-51, the Premier laid considerable stress on the important role played by the fishing industry in Newfoundland's economy and on the necessity for sweeping changes in methods and plans. It is expected that the general level of the industry will be the same as, or possibly slightly less than, last year when the catch was in the neighbourhood of 520 million pounds. Financial and other arrangements have been made which should enable 400,000 quintals of salt fish to be sold to Europe, but it is considered essential that the quantity of salt codfish sold to Europe should be reduced and that other fisheries should be developed. An appropriation of $1 million was being sought, with the object of setting up a Fisheries Development Loan Bank to facilitate the reorganisation and expansion of the industry.

Until the programme in its final form receives official approval no details are available, but from pointers in the Premier's speech it is permissible to judge the likely trend.

In addition to the general development of fishing other than codfishing, it is suggested that the present small open boats should be replaced by more modern vessels with dependable engines and equipped with newer types of fishing gear, etc.

Arrangements must be made for the handling by modern methods of various types of fish by freezing, reduction to meal and oil, and by any other or newer processes.

As there is every possibility of an extensive market being opened up in the near future, United Kingdom builders of fishing vessels and marine engines as well as manufacturers of fish processing plant and all auxiliary equipment are advised to examine the possibilities carefully.

The Trade Commissioner advises interested firms to send full details of their relevant products, including delivery periods, c.i.f. dollar prices, etc., to the Ministry of Fisheries and Co-operation, St. John's.

Bahia Cocoa Trade

ESTABLISHMENT OF NEW EXPORT BODY

A Bahia Cocoa Trade Commission was recently established in Brazil as an alternative to the present exporting system, and to the war-time expedient, which came to an end in 1946, of monopoly by the Bahia Cocoa Institute.

The Commission was organised by Bahia cocoa exporters in order to fix minimum prices daily or over a period for the sale of cocoa to foreign markets.

In fixing minimum prices the commission has expressed its intention to have regard to underlying economic factors rather than to establish any systematic valorisation.

The Commission has seven members and meets every morning to consider latest news of the world market and to establish minimum prices for the day's business. Besides supervising prices and general conditions of sale, the Commission proposes issuing fortnightly reports on the market for the benefit of local farmers, and a monthly report in English, for foreign distribution, containing useful information and current cocoa statistics.

The Bahia Cocoa Institute has a permanent place within the commission and a reorganisation is proposed in which technical and credit matters are expected to be foremost. It is felt that much has to be done to improve the quality of Bahia cocoa beans and to provide farmers with greater credit facilities.

None of the devastating diseases, such as swollen shoot and witch's broom, affecting other producing countries exists in Bahia. The most serious pest is the Enxerto ant, and plans are under way to eliminate it over a period of four years. This would bring about, in many cases, an output increase of 30 to 50 per cent. from affected farms, which constitute the great majority.

It is also hoped to eliminate "ham fat" smell in cocoa beans caused by improper fermentation processes.

OVERSEAS ENQUIRIES

Biscuits and Confectionery

The Lynd Continental Trade Co., of 5670, Wilshire Boulevard, Los Angeles, 36, California, are interested in importing the following articles from the United Kingdom: boiled sweets in bottles; biscuits in approx. 14 oz. tins; toffee and butterscotch; and cheese crackers (must be in cans).

Quotations should be in dollars, c.i.f. Los Angeles.

*

The United Kingdom Trade Commissioner at Montreal reports that Ya Ya, Ltd., of 1436, Mountain Street, Montreal, are interested in locating sources of supply in the United Kingdom of hard candies, toffee, nougat, hard filled candy bars, and similar confectionery. The company will probably wish to undertake the sale of such products throughout Canada as sole distributors, buying and reselling on their own account.

United Kingdom firms who are interested in this enquiry should send details of their products and prices (c.i.f. in Canadian currency) direct to the company at the above address.

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Confectionery and Canned Foods

The British Consulate-General at Los Angeles has been advised by Dr. Andrew Kalpaschnikoff, a professor of economics at the University of California, Los Angeles, that in company with a Mr. Graham, who is said to have good trading connexions in the San Francisco area, he intends to set up in business for the importation of merchandise of a distinctive British character for resale through department stores and other retail outlets. When the business is established he will be interested in purchasing confectionery, tea, and canned foods on his own account, payment being made by letter of credit through the Bank of America.

United Kingdom manufacturers interested in this new business are advised to communicate direct with Dr. Andrew Kalpaschnikoff at 11400, Sunshine Terrace, North Hollywood, Los Angeles, submitting catalogues and literature with quotations in dollars.

*

Canned Herrings

The United Kingdom Trade Commissioner at Brisbane has reported that R. M. Gow and Co. Pty., Ltd., 94, Roma Street, Brisbane, are interested in obtaining the agency for a United Kingdom cannery firm packing herrings. Failing a suitable agency, they wish to purchase annually 5,000 cases of canned herrings from a firm not represented in Australia.

The company own the largest wholesale grocery warehouse in Brisbane with a turnover of approximately £1,500,000 per annum.

United Kingdom firms who are not represented in Australia are invited to write direct to the Brisbane firm giving full details of their products and c.i.f. prices, etc.

*

Refrigerators

The Counsellor (Commercial) at Brussels has given notice that Brasserie Piedboeuf of Jupille, Liège, intend purchasing several thousand domestic and commercial refrigerators and would like to contact United Kingdom manufacturers of such equipment.

Firms interested in this enquiry should communicate direct with Brasserie Piedboeuf at the address given above, quoting reference Direction Technique 111, SB/27726, and enclosing catalogues, specifications, and export price lists, together with approximate delivery times.

*

Polarimeters and Refractometers

The United Kingdom Trade Commissioner at Johannesburg reports that Macdonald Adams and Company, 21, Klerk Street, Johannesburg, are interested in obtaining the representation of a United Kingdom manufacturer of polarimeters, which are used extensively by the South African sugar industry, and of sugar refractometers, as used in most food factories. It is understood that the company operate as wholesale chemists and are a subsidiary of South African Druggists, Ltd.

Interested United Kingdom firms are invited to communicate direct with the enquirers at the above address.

*

Air Conditioning Units

H.M. Consul at Basle reports that A.G. für Technische Neuheiten (Technical Novelties, Ltd.), Binningen (near Basle), are anxious to contact United Kingdom manufacturers of air conditioning units. The Swiss firm state that they are interested only in mobile apparatus which can be used in single rooms for the improvement of air conditions.

This apparatus should be capable of filtering the air, abating the bacteria-carrying dust, eliminating bad odours, moistening the dry air, and cooling down or warming up the air.

Interested United Kingdom firms are invited to communicate direct with A.G. für Technische Neuheiten at the address given.

*

Cane Sugar Refinery

The Counsellor (Commercial) to H.M. Embassy, Athens, reports that Economic Co-operation Administration finance is being sought for the erection in Greece of a cane sugar refinery with a proposed output of 400 tons per day.

It is understood that the technical and economic plans for the project have been prepared by U.S.A. firms and are at present before the E.C.A. Central Loans Committee in Athens. In the meantime, M. Constantine Ladas, who is one of the two interested parties, has been approached by the Counsellor (Commercial) and has expressed keen interest in obtaining quotations for machinery and equipment urgently from United Kingdom manufacturers.

Interested firms are therefore invited to communicate direct with M. Ladas at 22, Romvis Street, Athens.

German Sugar Production Plans

Every effort is being made by the West German authorities to encourage an expansion of the area under sugar beet so as to reduce the country's dependence on sugar imports.

Only 40 to 45 per cent. of Western Germany's sugar needs are at present being met from domestic production. Non-industrial use of sugar now averages 40 lb. *per caput* annually, while sugar processing industries have been allocated an annual quota of 800,000 tons, bringing total annual requirements to 1,200,000 tons of white sugar.

In the 1949-50 season, 54 per cent. of West German sugar requirements were imported, some 865,000 acres having been planted with sugar beet for the use of factories (resulting in a yield of 550,000 tons of white sugar). Expansion plans within the framework of the Marshall Plan aim at an increase in the acreage under sugar beet for factory use to 1,810,000 acres, which would increase the annual yield to 720,000 tons of white sugar.

Iraqi Date Company

The Date Association in Iraq has sponsored a new company, the Iraqi Date Trading Co., which is scheduled to begin active operations at the beginning of the forthcoming date season. The Association is contributing 49 per cent. of the capital, the remainder being subscribed by Iraqi grove owners and merchants in Basrah, Baghdad, and the Euphrates, and by the public. Foreign firms in Iraq dealing in dates will be permitted to participate.

The new company's present plans include the handling of date exports mainly from Central Iraq and the Euphrates area. It will also establish its own packing stations, fumigation plants, warehouses, cold storage installations, and factories for the manufacture of date products.

Infestation Control Project

Methods of safeguarding harvested grain from destruction by rats and insects in storehouses were observed by workers of many countries at a recent demonstration meeting conducted by the Food and Agriculture Organisation jointly with the Costa Rican Government.

Since last August an FAO entomologist has been stationed in Costa Rica, where a year-long co-operative demonstration project of grain storage and infestation control is being carried out. This project was set up following an FAO international conference on infestation held in February, 1949, in Cali and Palmira, Colombia, and is intended to provide a means of demonstrating practical control measures, where workers of the region can observe the techniques.

The delegates saw demonstrations of the operation of the grain storage plant in San José, viewing laboratory procedures, sampling, drying, and tests for moisture and insects. Demonstrations were given of fumigating methods in silos, closed rooms, and under tarpaulins, and spraying and dusting equipment was operated to show ways of treating grain in sacks and silos. Measures for controlling rats were discussed and demonstrated, and the delegates visited Puntarenas to see how rats and insects are controlled at shipping ports and during transit. A visit was made to the Inter-American Institute of Agricultural Sciences at Turrialba for observations and demonstrations of grain drying and other research work in progress there.

Wine Sold in Glasses

A novel method of presenting wine has been introduced by the CVA Corporation, San Francisco. Their product is sold in a wine glass with a metal vacuum-tight cap which seals the wine until it is ready to be served and is easily flicked off with any opener.

The size and design of the glasses have a definite customer appeal, and the pack offers advantages to bars and restaurants, since a single glass can be served without the need to open a full bottle. It also overcomes another stumbling block to wine sales—hesitancy about which glasses to serve with which wine.

The six wine types available in these footed wine glasses are: port, sherry, muscatel, burgundy, sauterne, and claret.

S. African Sugar Supplies

A special grade of centrifugal sugar for supply to manufacturers other than sweet producers is now being marketed by the South African sugar industry.

For some years the industry has made available a cheap type of sugar with a view to assisting the lower income groups. This sugar was commonly known as Grade 2, or Government grade sugar. It has been found, however, that considerable quantities of this sugar have been used by tanneries and manufacturers of other non-food products.

In future it will be contrary to the conditions of sale to supply this sugar for any purpose other than for human consumption.

It has also been announced that sugar purchased for ships' stores at South African ports will no longer be supplied at the price for local consumption. In future, ships will have to pay about 40s. per 100 lb. for sugar—approximately 16s. per 100 lb. more than the local price.

Synthetic Vitamin A

Vitamin A, high in potency and free from the fishy taste characteristic of that obtained from fish liver oil, is now synthesised commercially by Hoffman-La Roche from citral, which comes from lemon grass, mostly from India.

Two other companies are planning to go into production of synthetic vitamin A this year. The synthetic process may affect the trade in vitamin A derived from fish liver oils, such as those in Scandinavian countries and Japan.

Rhodesia to Grow More Sugar

Plans have been formulated for growing more sugar in Rhodesia. A number of firms have shown interest in the possibilities of large-scale sugar production in Northern Rhodesia, and the Government is doing all that it can to speed up the possible establishment of a sugar industry.

Northern Rhodesia's consumption has risen from 3,500 tons to 6,000 tons a year, and it is proving impossible to buy more than the latter amount, although the territory could probably consume 15,000 tons were it available.

Sulphur Dioxide in Italian Jams

A campaign against the use of sulphur dioxide in the manufacture of jams has been started by the Ministry of Trade and Industry in Italy, jointly with the National Health Board.

The first step in this direction has been to get the canning factories to sign an agreement under which the amount of sulphur dioxide must not exceed 50 mg. per kilogram of jam. The sale of products that conform to this requirement will be allowed until the end of 1951; after that date, every can or jar will have to carry a clear indication of the amount of sulphur dioxide included in the contents.

The limit of 50 mg. is provisional; the Health Board will fix a lower limit during 1951, and from January 1, 1952, all Italian jam containers will have to bear indications concerning the percentage of fruit, sucrose, and sulphur dioxide. The use of this preservative in the manufacture of jams will be permitted only under the supervision of a qualified chemist. Smaller factories which cannot afford a staff of qualified chemists will be obliged to accept the control of local State physicians or health boards.

Food Manufacture

News from the Ministries

Crude Black Molasses

Applications for licences to import from Australia crude black molasses with a sweetening content not exceeding 60 per cent., packed in containers of not more than 2 lb. net, will now be considered by the Board of Trade.

Applications should be made on Form ILD/A and addressed to the Import Licensing Branch, Board of Trade, Romney House, Tufton Street, London, S.W.1.

Canned Meats

Canned meats (other than canned ham; canned corned beef, mutton, or pork; and canned roast or boiled beef, mutton, or pork) may now be imported from Argentina, Brazil, Paraguay, Uruguay, and the Republic of Ireland under block licences granted to individual traders.

Applications for licences to import canned meats will now be considered from any *bona fide* importer, subject to the applicant undertaking to comply with certain conditions. Those wishing to share in these arrangements should submit an application (in duplicate) on Board of Trade form ILD/A, which may be obtained from the Board of Trade, Import Licensing Department, Romney House, Tufton Street, London, S.W.1, from the usual Customs Offices, or from the Ministry of Food, Private Imports Branch, Meat and Livestock Group, Government Buildings, Epsom Road, Guildford, Surrey. For administrative convenience, importers are asked to send such applications to the Board of Trade through the Ministry of Food at the above address.

Cheese Varieties

All cheese, except varieties that are needed for the ration, has been freed from price control. The varieties which continue to be subject to price control, whether home produced or imported, natural or processed, are: Cheddar, Cheshire, Derbyshire, Lancashire, Leicestershire, White Wensleydale, and Dunlop.

Control has also been removed from the production in the United Kingdom of all natural cheese except the varieties listed above. The manufacture of processed cheese will continue to be controlled.

Arrangements have been made by the Board of Trade for the issue of an open general licence, with effect as from July 8, 1950, for the import of:

1. Natural cheese other than the varieties listed above;
2. Processed cheese (prepacked for retail sale in wrappers or containers indicating the type of natural cheese) other than that made from the varieties listed above.

This open general licence will apply to imports which are consigned from and originate in any country or territory other than:

Albania, Argentina, Belgium, Belgian Congo, Bolivia, Bulgaria, Canada, Columbia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian Zone), Germany (Western), Guatemala, Haiti, Honduras, Hungary, Iran, Japan, Korea, Liberia, Liechtenstein, Luxembourg, Mexico, Nicaragua, Panama, Philippines, Poland, Roumania, Switzerland, Tangier, Uruguay, United States of America, Union of Soviet Socialist Republics, Venezuela, and Yugoslavia.

Marzipan from Ireland

Arrangements have been made for the importation under individual licence of a limited quantity of marzipan from the Irish Republic.

The marzipan will be imported through normal trade channels. Applications for import licences should be made in duplicate on the usual form ILD/A, obtainable from the Board of Trade, Import Licensing Branch, Romney House, Tufton Street, S.W.1. For administrative convenience, completed application forms should, in the first instance, be submitted to the Bakery Division of the Ministry of Food, London Road, Stanmore, Middlesex.

The marzipan to be imported under these arrangements should consist of ground almond kernels and sugar only and the almond kernel content must be at least 20 per cent. The unqualified description "marzipan" may be applied only where the percentage of almond is not less than 66⅔ per cent. In all other cases the word "marzipan" should be qualified by the addition of the actual percentage of almond kernels in the mixture, *e.g.* marzipan (40 per cent. almonds). Applications for import licences should be endorsed with the following information:

(*a*) Prices f.o.b. and c.i.f.
(*b*) Composition of the marzipan, *i.e.* percentage of sugar and almond kernels.
(*c*) Type, size, and weight of pack.

Imports of Poultry

All control over the prices and distribution of poultry was discontinued from July 1, 1950.

To enable traders to place orders at once in countries in the Southern Hemisphere, the Ministry of Food, in agreement with the Board of Trade and the Ministry of Agriculture, has arranged that imports of poultry by private traders can now be admitted under block licences from Argentina, Australia, New Zealand, Southern Rhodesia, and Uruguay.

These licences will allow traders to import unrestricted quantities of poultry from the sources indicated during the period of validity of the licences. They are, however, liable to be revoked if total expenditure on these imports exceeds the amount of currency available for the purpose.

Traders wishing to take part in these arrangements should write for further particulars to the Ministry of Food, Private Imports Branch, Meat and Livestock Division, Government Buildings, Epsom Road, Guildford.

Arrangements for traders to import poultry from other countries are also under consideration.

Sardines from Portugal

In accordance with the arrangements already made for Anglo-Portuguese trade during 1950, agreement has been reached in Lisbon with representatives of the Portuguese sardine canning industry for the purchase by the Ministry of Food of 500,000 cases (50 million tins) of sardines of the 1950 pack.

The sardines will be packed mainly in the popular "Quarter Club" size (4½ oz. net weight). The first shipment will arrive at the end of the year and supplies will be on sale early next year.

Milk Marketing Scheme

Acting in pursuance of Section 15 of the Agricultural Marketing Act, 1949, the Minister of Agriculture and Fisheries has made an Order (entitled the Milk Marketing Scheme (Amendment) Order, 1950, S.I. 1950, No. 1029) which amends the Milk Marketing Scheme, 1933, so as to bring it into conformity with that Act. The Order provides, *inter alia*, for the appointment by the Minister of members to the Milk Marketing Board, the regulation of investment of the Board's funds, and the establishment of a Disciplinary Committee to hear cases of alleged contravention of the Scheme. The Order came into operation on July 1, 1950.

The Minister of Food has also made an Order (entitled the Milk Marketing Board (Modification of Functions) Order, 1950), which amends the Milk Marketing Board (Modification of Functions) Orders, 1940 and 1942 (S.R. & O. 1940, No. 1716, and 1942, No. 2539). These amendments are made under Regulation No. 26 of the Defence (Agriculture and Fisheries) Regulations, 1939, and are consequential on the amendments of the Milk Marketing Scheme referred to above.

Canned Fruit Imports

Following the recent trade talks between the Netherlands and the United Kingdom, the Ministry of Food, in agreement with the Board of Trade, announces that canned fruit (other than mandarin oranges, apricots, peaches, pears, fruit cocktail, two fruits, fruit salad, grapefruit, grapes, and pineapple, including crushed pineapple) may now be imported from Holland under block licences granted to individual traders.

These licences will allow the importation of unrestricted quantities of canned fruit from Holland during the period of validity of the licences, provided that the national expenditure on such imports remains within the currency allowance authorised. In view of this proviso, it must be understood by all importers that it may be necessary at any time to discontinue or suspend without warning further imports.

Applications for licences to import these items will now be considered from any *bona fide* importer, subject to the applicant undertaking to comply with certain conditions. Those wishing to share in these arrangements should submit an application (in duplicate) on Board of Trade Form ILD/A, which may be obtained from the Board of Trade, Import Licensing Department, Romney House, Tufton Street, S.W.1, from usual Customs Offices, or from the Ministry of Food, Canned Fish, Fruit, and Vegetables Division, 39, York Terrace, N.W.1. For administrative convenience importers are asked to send such applications to the Board of Trade through the Ministry of Food at the above address.

Export of Seed Potatoes

From July 1, 1950, to May 31, 1951, the export of seed potatoes of the 1950 crop will be under open general licence, with the exception of the varieties Majestic, King Edward VII, Arran Peak, Arran Banner, and Arran Pilot, which will be subject to export licences.

The arrangements for exporting the excepted varieties will be announced when the crop prospects are better known.

Imports of Beans

It was announced by the Ministry of Food on April 6, 1950, that, as from April 10, 1950, open individual licences would be granted for the import of white beans for human consumption, but that for the time being such licences would normally be issued only to canners of beans in tomato sauce.

The intention now is to place all types of beans for human consumption on open general licence in the early autumn. In the meantime, the Ministry of Food and the Board of Trade have agreed to extend the present arrangements for the granting of licences and to issue specific licences to any importer, whether he may be buying for canning or for the grocery trade. Licences to import beans from Chile will, however, be granted only to canners, except in the case of the type of bean known as Cristales which may be brought in by any importer.

Applications for specific licences for beans should be submitted (in duplicate) to the Board of Trade on form ILD/A, which may be obtained from the Board of Trade, Import Licensing Branch, Romney House, Tufton Street, London, S.W.1, or from the usual Customs Offices. For administrative convenience importers are asked to submit their applications through the Ministry of Food, Home-grown Cereals Division, Stanmore, Middlesex.

Edible Pulses

The Pulse (Revocation) Order, 1950, which came into force on July 1, 1950, gives effect to the decision, which has already been announced, to remove control over the maximum prices and distribution of edible dried beans and peas (including threshed home-grown peas), split peas, and split lentils, when sold for human consumption.

The responsibility for the import of some edible pulses has already been returned to the private trade. The arrangements for the private import of other edible pulses will be announced later.

Prices of Feedingstuffs

The Feedingstuffs (Prices) Order, 1950, has been amended with effect from July 1, 1950. The principal changes are:

1. Revised basic prices are prescribed for imported or processed wheat, rye, and oats to correspond to the prices which, as already announced, will be paid to growers in Great Britain for wheat, rye, and oats produced during the crop year July, 1950, to June, 1951.

2. The basic price of grain sorghums is reduced by 15s. a ton, and the description of this grain is altered so as to include dari.

3. Price control is removed from imported and processed feeding peas, pea by-products, processed beans, and lentil by-products.

4. Changes are made in the provisions for the costing of barley and oats in compound feedingstuffs.

Potato Marketing

The Potatoes (General Provisions) Order, 1948, and the Ware Potatoes (1949 Crop) (No. 2) Order, 1949, have been amended with effect from June 11, 1950, in consequence of the freeing of new potatoes from price control this season.

The effects of the Amending Orders are:

1. The restrictions which were imposed on the movement of old potatoes so as to facilitate the orderly marketing of the 1949 crop are cancelled and there are to be no restrictions on the movement of new potatoes.

2. The prohibition on the sale of new potatoes on commission, which was imposed to support the fixed prices previously prescribed for new potatoes, is removed.

3. Growers may sell their potatoes "in the ground" or "as grown" to licensed potato merchants or licensed potato buyers.

Flour Millers' Grists

Grists for bread making in England and Wales were altered on July 14, 1950, to:

75 per cent. Manitoba wheat (maximum) including 20 per cent. of low-grade Manitobas.

25 per cent. other imported wheats, as available.

No alterations have been made in the grists for Scotland and Northern Ireland.

Closing of Fish Offices

Port and Area Fish Distribution and Fish Agents' Offices in Aberdeen, Fleetwood, Grimsby, Hull, and Belfast have been closed. The Area Fish Distribution Office at 4th Floor, King William Street House, Monument, London, E.C.4, is also closed.

All enquiries about the distribution of fish and all communications about the Fish Transport Scheme, including accounts for payment, should be addressed to The Finance Director, Ministry of Food, Fish Division, Carlton Hotel, Pall Mall, London, S.W.1.

Canned Cooked Hams

An open general licence will be issued, with effect from June 17, 1950, for the import of canned cooked hams, canned cooked gammons, and canned cooked shoulders which are consigned from and originate in any country or territory other than:

Albania, Argentina, Belgium, Belgian Congo, Bolivia, Bulgaria, Canada, Columbia, Costa Rica, Cuba, Czechoslovakia, Dominican Republic, Ecuador, El Salvador, French Somaliland, Germany (Russian Zone), Germany (Western), Guatemala, Haiti, Honduras, Hungary, Iran, Japan, Korea, Liberia, Liechtenstein, Luxembourg, Mexico, Nicaragua, Panama, Philippines, Poland, Roumania, Switzerland, Tangier, Uruguay, United States of America, Union of Soviet Socialist Republics, Venezuela, and Yugoslavia.

Canned cooked hams, canned cooked gammons, and canned cooked shoulders may be imported under the block licensing arrangements from Belgium, Argentina, Poland, Uruguay, and Yugoslavia.

The block licences will allow the importation of unrestricted quantities of the items concerned from the sources indicated during the period of validity of the licences, provided that the national expenditure on imports from each source remains with the currency allowance authorised. In view of this proviso, it may be necessary to discontinue or suspend without warning further imports from any of these sources.

Applications for licences to import canned cooked hams, canned cooked gammons, and canned cooked shoulders will now be considered from any *bona fide* importer, subject to the applicant undertaking to comply with certain conditions. Those wishing to share in these arrangements should submit an application (in duplicate) on Board of Trade form ILD/A, which may be obtained from the Board of Trade, Import Licensing Department, Romney House, Tufton Street, London, S.W.1, from the usual Customs Offices, or from the Ministry of Food, Imports Branch, Bacon and Ham Division, Block A, London Road, Stanmore, Middlesex. For administrative convenience, importers are asked to send such applications to the Board of Trade through the Ministry of Food at the above address.

Canned Cherries from Italy

Canned cherries from Italy may now be imported under block licences granted to individual traders.

These licences will allow the importation of unrestricted quantities of canned cherries from Italy during the period of validity of the licences, provided that the national expenditure on such imports remains within the currency allowance authorised. In view of this proviso, it must be understood by all importers that it may be necessary to discontinue or suspend further imports without warning.

Applications for licences to import these items will now be considered from any *bona fide* importer, subject to the applicant undertaking to comply with certain conditions. Those wishing to share in these arrangements should submit an application (in duplicate) on Board of Trade Form ILD/A, which may be obtained from the Board of Trade, Import Licensing Branch, Romney House, Tufton Street, S.W.1, from usual Customs Offices, or from the Ministry of Food, Canned Fish, Fruit, and Vegetables Division, 39, York Terrace, N.W.1. For administrative convenience importers are asked to send such applications to the Board of Trade through the Ministry of Food at the above address.

Anglo-Czechoslovak Trade Talks

The discussions which have been taking place in Prague between the representatives of the Governments of the United Kingdom and of Czechoslovakia to make detailed arrangements for the second year's trade under the five-year Anglo-Czechoslovak Trade Agreement signed in London in 1949 were concluded recently.

The arrangements provide for trade between the United Kingdom and Czechoslovakia in the twelve months commencing July 1, 1950, at a higher level than in the first year of the agreement.

The principal United Kingdom imports from Czechoslovakia will include sugar, miscellaneous foodstuffs, and manufactured goods. Total of United Kingdom imports may reach £13·5 million. Czechoslovakia's main imports from the United Kingdom and sterling area will be raw materials, machinery, chemicals, plastic materials, and manufactured goods.

Food Imports from Holland

As a result of trade talks held between the Netherlands and the United Kingdom, the Ministry of Food and the Ministry of Agriculture and Fisheries have announced the following estimates of imports of food and agricultural items from the Netherlands during 1950. These figures are estimates only and they do not include products which may be imported under open general licences. The agricultural items, and certain of the foods, are subject to the Sanitary Regulations of the Ministry of Agriculture and Fisheries.

	Tons.
Butter	15,000 (minimum)
Bacon	25,000 (minimum)
Starches and starch products	70,440
	£
Fresh fruit and vegetables, and fruit and vegetable products ...	2,632,000
Meat products, game, fish products	4,370,000
Confectionery, cocoa products, bakery goods, etc.	5,820,000
Miscellaneous food items	5,782,000
Livestock and bees ...	110,000

Further discussions are to take place during 1950, especially about milk products, and about eggs, for which precise arrangements for supply during the winter months have yet to be agreed.

Labelling of Food

PROVISIONS OF NEW ORDER

The Labelling of Food Order, 1950, which comes into force on November 1, 1950, re-enacts and consolidates, with amendments, the Labelling of Food Order, 1946, as amended.

The principal change is that the weights and measures provisions of the old Order are omitted. They will be re-enacted in an Order to be made by the Board of Trade.

The new Order contains several new provisions, the most important of which are:

1. The description ginger wine or orange wine may be applied to products wholly or partly derived from fruit other than grapes.

2. Black beer and rum which have a normal lower alcohol content than that prescribed for mixtures containing spirits may be sold if they contain not less than 20 per cent. proof spirit.

3. Alcoholic cordial containing less than 5 per cent. proof spirit may be sold subject to special labelling requirements.

4. The sale of bitters containing not less than 15 per cent. proof spirit is permitted.

5. Non-alcoholic fruit (or vegetable) juice cocktail may be sold if it contains not less than 80 per cent. undiluted fruit or vegetable juice.

6. Liquors for which tonic, restorative, or medicinal properties are claimed, or which are held out to be of special benefit to invalids, must be labelled with a statement indicating the quantity of the ingredients on which the claim is based.

7. Concentrated acetic acid must comply with certain special labelling requirements.

8. Tonic properties may not be claimed for any food on the sole grounds that the food contains (*a*) alcohol; (*b*) sugars or other carbohydrates; (*c*) protein or substances prepared by hydrolysis of protein; or (*d*) caffeine or other purine derivatives.

9. Prepacked cheese must be labelled in accordance with the provisions of the Order except that no declaration of ingredients need be given.

10. The ingredients of Christmas puddings must be specified on the label after March 31, 1951.

11. The following generic designations may be used in declarations of ingredients: nuts, synthetic cream, fish, and vine fruits. (The designation "vine fruits" may not be used in declaring ingredients of beverages.)

12. When tomato ketchup, catsup, sauce, and relish are prepacked for sale as such, they must be labelled with a declaration of ingredients even though a standard for products of this kind has now been prescribed.

Price of Raw Cocoa

The Raw Cocoa (Control and Maximum Prices) Order, 1946, has been further amended with effect from June 24, 1950, so as to increase the maximum price of West African raw cocoa from 190s. 4d. to 208s. 4d. per cwt. *ex* store, exclusive of duty. The increase is due to the rise in the world price of cocoa beans since last autumn.

Overseas Food Corporation

The period of office of Mr. Frank Samuel, managing director of United Africa, Ltd., as a part-time member of the board of the Overseas Food Corporation expired on February 15 last.

The Minister of Food invited Mr. Samuel to remain on the board for a further period, but he has felt unable to accept this invitation owing to the continued heavy pressure of other work.

Starch Food Powders

The Starch Food Powders (Control) Order, 1944, has been amended with effect from June 18, 1950, so as to remove the provision that packets of cornflour, custard powder, or blancmange powder must be marked with the retail price.

Food Substitutes

The Food Substitutes (Control) Order, 1941, was revoked on June 11, 1950, so that licences are no longer needed for the manufacture of food substitutes.

This Order was introduced at a time when many foods were becoming scarce and one of its objects was to protect consumers from substitutes containing undesirable ingredients. The Ministry considers that it is no longer necessary to retain this control now that supplies of most foods are more plentiful.

Appointments

Sir Eric Coates, C.S.I., C.I.E., has been appointed chairman of the board of the Overseas Food Corporation as from July 1.

Born in 1897, Sir Eric Coates served in World War I, after which he joined the Indian Civil Service in 1921. He held a number of important posts in India, and from 1947 to 1949 was Chief of Finance Division, Control Commission for Germany, and Financial Adviser to the British High Commissioner for Germany. In November, 1949, he was appointed a full-time member of the board of the Overseas Food Corporation with special responsibility for financial matters. He was created a Knight Bachelor in 1945.

*

For reasons of health, Sir John Mollett has resigned from the post of Director of Potato and Carrot Division. Sir John Mollett was the first chairman of the Potato Marketing Board and he has been in charge of the Potato and Carrot Division since the beginning of control in 1939.

The Minister of Food has appointed Mr. C. H. Lewis, C.B.E., to succeed Sir John Mollett, with effect from June 1, 1950. Mr. Lewis was appointed Deputy Director of Potato Division at the outbreak of war and for the past ten years he has been in charge of the Fresh Fruit and Vegetables Division of the Ministry.

Mr. E. C. U. Wilson, who has been Director of Fish Supplies, has taken charge of the Fresh Fruit and Vegetables Division which was amalgamated with the Fish Division with effect from June 1.

*

Mr. G. D. Lundie has been appointed secretary of the Food Standards Committee in succession to Mr. K. R. Allen, who is being seconded to the Treasury for duty in the Lord President's Office.

Mr. B. W. Smith has been appointed secretary of the Metallic Contamination Sub-Committee.

Licensing of Wholesalers

Following the removal of canned meat, canned meat products, and condensed milk from the points rationing scheme on April 23, 1950, and the unit voucher scheme on May 20, 1950, licences to sell these foods by wholesale are no longer needed.

The Food (Licensing of Wholesalers) Order has been amended to give effect to this decision.

Information and Advice

Manufacture of Citric Acid

B.4354. *Can you furnish us with details of the manufacture of citric acid from lemons?* (India.)

The process briefly consists of crushing the fruit, screening off the larger particles, and allowing the juice to ferment until the sugar is removed. It is then filtered, either with or without the use of infusorial earth. It is nearly neutralised with ground limestone or hydrated lime, and the neutralisation finished with milk of lime. The precipitation takes place while the solution is boiling, as citrate of lime is more soluble in cold than in hot water. The precipitated citrate is allowed to settle, the supernatant liquid decanted and the product washed at least once with boiling water. The citrate is then suspended in water and a sufficient amount of sulphuric acid to decompose it is added to the suspension. As a result of the decomposition of the calcium citrate, considerable calcium sulphate is precipitated and is removed from the solution by filtration. The dilute citric acid solution is evaporated in vacuum pans and after reaching the proper consistency is allowed to crystallise. The vacuum pans used are either lined with lead or Monel metal, or are enamelled. The crystallisation is usually carried out in lead or Monel metal lined vats.

The first crop of crystals, if too dark for commercial use, is dissolved and recrystallised after treating with bone char or other carbon blacks. Impurities in the way of lead or other heavy metals must be removed during the recrystallisation. This is ordinarily carried out by the use of hydrogen sulphide or other reagents.

The manufacture of citric acid involves a large investment in machinery and the process necessitates considerable chemical control.

Sherbet

B.4422. *Can you suggest a formula for the manufacture of sherbet which does not include sugar among the ingredients?* (London.)

We suggest that you try the following formula for sherbet, which we submit as a basis for trial:

Soluble saccharin 500	3 oz.	Magnesium carbonate	1 lb.
Lactose	2 lb.	Calcium phosphate	1 lb.
Tartaric acid ...	8 lb.	Cornflour	4 lb.
Sodium bicarbonate	7 lb.		
Oil of lemon ...	½ oz.		

Information Supplied

The Enquiry Service has dealt with requests for the names of manufacturers and suppliers of plant, machinery, and materials, and also general information as follows:

B.4323. *Small size heat sealing equipment.* (London.)

B.4330. *Stainless steel pulpers, and filling machines for jams.* (Yorks.)

B.4333. *Stainless steel equipment, and evaporators.* (New Zealand.)

B.4334. *Plant for the manufacture of pop corn.* (Israel.)

B.4335. *Hermetic seal cans for jam jars.* (Derbyshire.)

B.4344. *Price stamping machine.* (Yorks.)

B.4345. *Plant for the manufacture of sausage rusk.* (London.)

B.4346. *Animal charcoal.* (Yorks.)

B.4350. *Stainless steel plant for the manufacture of jelly crystals, and packing machinery.* (London.)

B.4351. *Aluminium foil.* (Scotland.)

B.4352. *Flavouring and essences.* (Ireland.)

B.4353. *Glass bottles and jars.* (Africa.)

B.4354. *Canning plant for fruit and vegetables, equipment for fruit juice plant, plant for the manufacture of citric acid from lemons.* (India.)

B.4356. *Hylotherms.* (South Africa.)

B.4364. *Filling equipment, can sealing machinery, retorts for processing, and labelling machines for the canning of tomato soup.* (Sussex.)

B.4365. *Noodle manufacture machinery.* (Glos.)

B.4369. *Weight filling machines for cans.* (Kenya Colony.)

B.4373. *Shelled nuts, roasters, blanchers, and Cellophane bags, machinery for roasting by hot air, and for heat-sealing bags.* (Ireland.)

B.4374. *Automatic bakery plant.* (Africa.)

B.4375. *Large pressure cooker.* (Lancs.)

B.4380. *Biscuit tins and salt twists.* (Durham.)

B.4390. *Small plant for washing biscuit tins.* (Scotland.)

B.4391. *Automatic weighing machines for handling nuts.* (Australia.)

B.4412. *Confectionery and biscuit machinery.* (Surrey.)

B.4416. *Apple pectin for jam making.* (Ireland.)

B.4419. *Coffee roasting machines.* (Durham.)

B.4421. *British Agar.* (Belfast.)

B.4423. *Gammexane and insecticides.* (London.)

B.4424. *Small ice cream plant.* (Lancs.)

B.4426. *Automatic machinery for filling fish paste into small glass jars.* (South Africa.)

B.4427. *Glyceryl monostearate.* (London.)

B.4428. *Drying plant for bananas.* (London.)

B.4430. *Metal detectors.* (Essex.)

B.4431. *Fruit wrapping machine.* (Staffs.)

B.4433. *Poultry plucking machine.* (Wilts.)

B.4435. *Popcorn machinery.* (Surrey.)

B.4438. *Small electric goods lift.* (Scotland.)

B.4441. *Bread wrapping machine.* (Kenya Colony.)

B.4454. *Saccharin.* (Lancs.)

B.4457. *Aerosol insecticide.* (Australia.)

B.4458. *Thickeners for salad cream.* (Lancs.)

B.4463. *Citrus pectin.* (London.)

B.4465. *Tin openers.* (Scotland.)

B.4466. *Lemon curd.* (Berks.)

B.4467. *Pastry rolling machinery.* (Yorks.)

B.4469. *Prepared mustard and French mustard.* (S. Africa.)

B.4471. *Collapsible metal tubes.* (Ches.)

B.4475. *Biscuit ovens.* (Singapore.)

B.4477. *Silicone glazes for bread tins.* (British West Indies.)

Recent Patents

638,789. SCHAPIRO, H.: Vacuum coffee-making apparatus.
638,803. ARMSTRONG CORK COMPANY: Closure for bottles, jars, and the like.
638,819. FLOWER, A. L.: Machines for labelling bottles and other containers.
638,838. SIMON (HOLDINGS), LTD., H., LOCKWOOD, J. F., and BALL, J. S.: Roller mills for cereal products.
638,852. ROWTON, H. S.: Machines for skinning fish.
638,871. SOC. FRANÇAISE DE CONSTRUCTIONS MÉCANIQUES ANCIENS ÉTABLISSEMENTS CAIL: Apparatus for the forced feed of crushers and particularly of sugar cane mills.
639,032. PATZAK, K.: Portable rotary filling, milling, and grinding machine.
639,034. BALL, W.: Canning machines.
639,198. COMPAGNIE DE FIVES-LILLE: Sugar cane mills.
639,248. JANSSE, A. P. C.: Baking of bread and like bakery products.

Abstract of a Recent Specification

Preservation of Fruits

This invention relates to a device for keeping goods, *e.g.* fruits, which are preserved in the liquid contents of a container having a removable lid, submerged in the preservative liquid.

The uppermost layer of fruits preserved in syrup contained in hermetically sealed containers tends, either before or after the sealing of the container, to rise and become exposed above the surface of the syrup leading ultimately to discoloration and damage of the exposed layer. The invention provides a device for keeping the fruit submerged in the syrup and thus preserving it from such discoloration and damage.

A device according to the invention consists of a length of spring wire, having substantially the form of an upholstery spring, one end of which engages the lid of the container. The other terminates in a spiral coil, the plane of which is substantially horizontal when the device is in use.

The invention also comprises the combination with a container lid having an internal circular cavity of a device as above described of which the end engaging the lid terminates in a single convolution adapted to be resiliently engaged in or centred in the cavity.

638,762. *Vagn Nedergaard Pedersen.*

Recent patents have been selected from the "Official Journal of Patents" and are published by permission of the Controller of H.M.S.O.

Trade Marks

PLAZA.—681,896. Tomato paste, dried peas, tinned poultry, tinned vegetables, peppers in brine, salad oil, and tinned meat. **Louis Giuriato,** trading as **Bonus Foods,** 404, Union Street, Vancouver, Province of British Columbia, Canada; Manufacturer.
STAR BRIGHT.—682,918. Isinglass for use as an ingredient in food. **Morrison Carpenter and Co., Limited,** 5, Bedford Park, Croydon, Surrey; Manufacturers.
SLIKO.—683,965. Chocolates and non-medicated confectionery. **Batger and Co., Limited,** 566, Cable Street, London, E.1; Manufacturers.
LAUREL.—684,221. Salad cream, pickles, horseradish (dried or preserved), and mayonnaise. **Jos. Themans, Limited,** 40 and 42, Tooley Street, London, S.E.1; Manufacturers.
BAVY.—684,440. Salt, gravy salt, mustard, pepper, vinegar, sauces, ketchups, chutneys, and spices. **R. C. Barker and Company, Limited,** Turret Mills, Turret Lane, Ipswich; Manufacturers and Merchants.
CHOCOFAIT.—684,645. Chocolate and non-medicated chocolate confectionery. **Chocolat Parfait Company, Limited,** Tunmarsh Lane, Plaistow, London, E.4; Manufacturers.
DALTOSE.—684,652. Infants' and invalids' foods. **Cow and Gate, Limited,** Cow and Gate House, North Street, Guildford, Surrey; Manufacturers.
CRUMPTIES.—684,662. Salted nuts. **The Maxilin Marketing Company, Limited,** Maxilin House, Sharples Vale, Astley Bridge, Bolton, Lancashire; Manufacturers.
STIM.—684,741. Non-alcoholic and non-medicated fruit drinks. **Stimlo Beverage Company, Limited,** 19A, Coleman Street, London, E.C.2; Manufacturers.
CRISCO.—684,943. Edible oils and edible fats. **Thomas Hedley and Company, Limited,** Phoenix Buildings, Collingwood Street, Newcastle-on-Tyne; Manufacturers.

Trade marks have been selected from the "Official Trade Marks Journal" and are published by permission of the Controller of H.M.S.O.

New Companies

Housden's Stores, Limited. (481433.) 29-30, Oxford Road, High Wycombe. To take over business of grocers and provision merchants carried on at High Wycombe as "Housden's Stores." Nom. cap.: £20,000 in £1 shares. Permt. dirs.: G. E. Housden, 33, Roberts Road, High Wycombe; H. C. Housden, 14, Coningsby Road, High Wycombe; D. J. Housden, Dengrove, Green Hill, High Wycombe.

H. P. Bramhill and Company, Limited. (481434.) Eastoft, near Scunthorpe, Lincs. To carry on business of farmers, fruit and vegetable growers, etc. Nom. cap.: £15,000 in £1 shares. Dirs.: H. P. Bramhill and Peggy Bramhill, Grove House, Althorpe.

J. and F. (Fisheries and Delicatessen), Limited. (481465.) 46, Market Place, Reading, Berks. Nom. cap.: £1,800 in £1 shares. Dirs.: to be appointed by subs. Subs.: P. R. Daish, The Withies, Arborfield, near Reading (clk.); Mrs. E. J. Redshaw, 5, Wood-Waye, Woodley, near Reading (clk.).

E. G. Bower, Limited. (481510.) To carry on business of manufacturers of and dealers in food and horticultural products, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: O. J. Hook (clk.) and C. A. Dale (clk.), 11, Waterloo Place, London, S.W.1.

Evers and Wall, Limited. (481511.) West Street, Adbourne, near Marlborough, Wilts. To carry on business of manufacturers of and dealers in chemicals and insecticides used for agriculture and for the preparation and preservation of foodstuffs, etc. Nom. cap.: £100 in £1 shares. Permt. dirs.: C. E. St. John Evers, Bell Cottage, Bury Gate, Pulborough; E. Wall, Church Farm, Whelford, Fairford, Glos.

Gosbell, Limited. (481517.) 55, Cornwall Street, Birmingham. To carry on business of butchers, meat salesmen, etc. Nom. cap.: £100 in £1 shares. Dirs.: R. P. Garner, Cryers Oak, Norton Green Lane, Knowle, Warwicks.; A. Van der See Eden, 17, Fladbury Green, Selly Oak, Birmingham, 29.

J. and H. Goodwin (Manchester), Limited. (481523.) To take over business of fruit brokers carried on in Manchester and elsewhere by J. and H. Goodwin, Limited. Nom. cap.: £75,000 in £1 shares. Dirs.: H. Goodwin, 2, Grove House, Knutsford, Cheshire; J. S. Johnston, Chowringhee, The Firs, Bowdon, Cheshire; C. Goodwin, C. Goodwin, junior, and H. Davidson.

Continental Cafés (Ryde), Limited. (481566.) Continental Café, Esplanade, Ryde, I.W. To take over business carried on at Ryde, I.W., by Randall B. M. Ward. Nom. cap.: £800 in £1 shares. Dirs.: R. B. M. Ward and Mrs. E. Ward, Continental Café, Esplanade, Ryde, I.W.

M. Morello, Limited. (481590.) 2, James Street, Covent Garden, London, W.C.2. To carry on business of potato merchants, fruit brokers, produce merchants, etc. Nom. cap.: £2,000 in £1 shares. Dirs.: M. Morello and Mrs. L. E. Morello, 136, Aldermans Hill, London, N.13.

Tranter and Mayer, Limited. (481599.) 103, Manchester Road, Denton, Lancs. To carry on business of fishmongers, game and poultry merchants, etc. Nom. cap.: £8,000 in £1 shares. Dirs.: A. W. Mayer and Mrs. F. M. Mayer, Cranmere, Briwere Road, Torquay; J. W. Tranter and Mrs. M. M. S. Tranter, 16A, Victoria Street, Paignton.

Kind Knight, Limited. (481634.) Foryd Road, Kinmel Bay, Denbighshire. To carry on business of fishing and trawling, fish curers, merchants, etc. Nom. cap.: £1,400 in £1 shares. Dirs.: J. E. D. Stokes, 139, Sandy Cove, Kinmel Bay; F. P. T. Harris, 94, Sandy Cove, Kinmel Bay.

Southern (Catford), Limited. (481649.) 2, Sandhurst Parade, Catford, London, S.E.6. To carry on business of bakers, confectioners, pastrycooks, etc. Nom. cap.: £1,000 in £1 shares. Dirs.: to be appointed by subs. Subs.: Mrs. H. E. Cooper and S. T. Cooper, 23, Inglewood Road, Barnehurst, Kent.

Birco (Caterers), Limited. (481667.) 18, Dragon Square, Chesterton, Staffs. Nom. cap.: £1,000 in £1 shares. A. Birch, 51, Whitfield Avenue, Newcastle, Staffs., signs as director.

Brer Rabbit Catering Company, Limited (481668.) 24-26, Watery Lane, Bordesley, Birmingham, 9. Nom. cap.: £1,000 in £1 shares. Dirs.: F. D. Lewis and Ida M. Bloor, 241, Harborne Road, Edgbaston, Birmingham, 15.

J. and E. West (Fisheries), Limited. (481680.) 61, Park Street, Weymouth. Nom. cap.: £2,500 in £1 shares. Dirs.: E. V. West and Mrs. V. M. West, 348, Dorchester Road, Weymouth.

Shirleys (Sparkhill), Limited. (481687.) 500, Stratford Road, Sparkhill, Birmingham, 11. To carry on business of greengrocers, grocers, and provision dealers, etc. Nom. cap.: £5,000 in £1 shares. Dirs.: L. A. Whitehouse, 34, Florence Road, Sutton Coldfield; L. Thomas, 6, Southern Road, Ward End, Birmingham, 8.

Taken from the Daily Register, compiled by Jordan and Sons, Limited, Company Registration Agents, 116, Chancery Lane, London, W.C.2.